The Builder.

VOL. XXVI.—No. 1305.

A Glance at the Position.

IF the legendary attribute of the month of March, that its close is the opposite of its commencement, may be held to apply to the year, 1868 should go out as a lamb, for it certainly enters as a lion. A grave and anxious care seems to brood over the civilized world. Fifty thousand London citizens quit the cheerful blaze of the yule log for the chilly duty of the special constable, — responding to the invitation given by ourselves and by other friends of tranquillity and good order, to see that the stable-door is shut *before* the steed is stolen. The ring of the bricklayer's trowel and the dull thud of the mason's pick, are less audible than is the hammer of the armourer. Too many, from engineer-in-chief to "navvy," find themselves able and willing for the work which is not forthcoming. Our nearest neighbour is ornamenting the armed and touchy peace which her present ruler invented, by raising her army from 800,000 to 1,200,000 combatants, and by extending the non-productive occupation of her youth from a period of seven years to one of nine years, abolishing, at the same time, the limit of minimum height for a soldier, already reduced by the wars of the first empire. Italy, the very stones of which cry out for the magic and fertilising touch of the engineer, has thrown herself back, by a month's insanity, for another sorrowful decade. The great aggressive power of Northern Germany pauses only, like the gorged python, to digest the last morsel, before attempting a new swallow. The heirs of the policy of Catherine the Great are twisting and stealing towards the coveted capital of the Greek empire. The King of Hungary has hardly learned to recognise himself in his new clothes. Everywhere is portentous expectation, and expectation of that injurious kind which stops, instead of stimulating, industrial activity; and that certain political barometer, the national revenue, has, for the first time for many years, lost its elasticity.

The "turn of the year" has brought with it ample illustration of that unprecedented and anomalous state of industrial life to which we have not unfrequently referred in these columns. The strong vitality of the commonwealth, using that term in its original sense of the actual welfare of the great mass of the nation, has resisted a collapse, not only in that artificial and unsafe system of credit into which the modern relations of commerce have been developed, but in the habit of public enterprise, and even in that ordinary confidence of the English character which has proved a main element of our national prosperity. We regard with wonder the attachment shown by the inhabitants of the towns that lie at the base of Vesuvius to the perilous site of their abodes. Again and again has it occurred that Torre del Greco, Resina, and adjoining villages have been all but extinguished by the earthquakes that accompany an eruption, such as is now actually in progress, of their fiery neighbour. Not a house on the last occasion before the present escaped more or less injury. The most massive and imposing buildings were the greatest sufferers. The direction of the "earth wave" or line of vibration of the shocks, was most distinctly ascertainable from the cracks in the walls and roofs of the houses that were not thrown down. For three or four days after the sudden outbreak of Vesuvius, marked by a roar like the explosion of a gigantic powder-magazine, Torre was deserted, and a stream of boiling water ran in a constant and plentiful rivulet from a new spring that had opened near the town into the blue waters of the bay. Within a week or ten days the awful silence of the streets was exchanged for an unwonted activity. The mason and the carpenter were in occupation. Props and shores and wooden centering rose like a forest; and the ready and ingenious craft of the Italian mason, soldering a huge crack here, throwing a relieving arch there, cutting out and replacing a damaged portion of a façade in another direction, had, in a month or two from the desertion, restored the town to as much apparent comfort and regularity as is ever to be found in those buildings which, being chiefly constructed of tufa, have at the best of times somewhat of a decayed and ruinous aspect.

So it is with commercial credit. Its basis and element are the anticipation of profit. It is to Italian ingenuity that we owe the main instrument of credit—the great lever of the banking business,—the bill of exchange. Any remarks as to the hazardous terms on which the main part of the whole complicated financial relations of the country is conducted, are likely to be received by "men of business," with as much cool compassion as the householder of Torre del Greco will extend to the ignorant stranger who counsels him to change his place of abode. It may be thought that the persons mainly interested are likely to know more than the bystanders. In one respect, at least, they are, if they live long enough, certain to know more. They will enjoy the benefit of actual personal experience. Nay, the convulsions of the credit system occur with even greater constancy than do the Vesuvian earthquakes, while the damage which they occasion is felt over an incomparably wider area. So great an advance have the political economists of our time made in the science of commercial convulsion, that they have detected the existence of a cycle or decennial period, at the expiration of which ruin and disaster may be confidently predicted. A maximum of confidence is held invariably to precede, and to foretell, these periods of extreme depression of the barometer of public confidence. And the long stagnation that has succeeded the sudden thunder-burst of the 11th of May, 1866, is now explained by the statement that the panic of that year was antedated. Panic was due in 1867—it was abnormal in 1866. The two systems of waves, the illegitimate and unwarranted panic which the failure (we will not repeat the adjectives) of the great bill-broking house caused on its own account, and the duly to be expected alarm and ruin normal to 1867, have intermingled with mutually augmented intensity. And so an unprecedented tardiness of recovery has intervened.

This great adversity, bitterly felt as it has been by many a fireside, or by many a hearth where fire ought to have been cheerily blazing, in this inclement winter, is not altogether without its uses. Its prolongation, which has been its most painful feature, has perhaps, in this respect, been its most useful characteristic. It has made men serve a long and unwilling apprenticeship to caution. Nothing short of so continued a strain would have compelled the directors of our great railway companies to set their houses thoroughly in order. This one after another has been compelled to do.

Considerations like these, or, at all events, the facts on which they are based, have called the attention of some of our daily contemporaries to what they term the "elasticity" of the national resources. The most familiar instance of this elasticity is the revenue. For a series of years the revenue has improved more rapidly than experience warranted the Chancellor of the Exchequer to expect. Let him make as much allowance as he could justify to the House of Commons for the increasing productiveness of the diminished taxes, there has been always an odd million or so to the good cropping up at the end of the year. This pleasing phenomenon has, for the time, ceased. The revenue, we are told, has lost its elasticity. It is of little use to quarrel with the language in which so discouraging a statement is made; but we think that the term which has been borrowed from the dictionary of the mechanic is not a happy one. It tends to conceal the actual fact, and, quite unconsciously, to "make things pleasant" by such concealment. Elasticity is not a force. It is merely a certain mode of resistance. It cannot, under any circumstances, improve the original condition of the bodies which it characterises. It can only restore disturbed equilibrium, or facilitate the disturbance which causes motion. But the increase of the revenue has been something far more vital. It has been actual growth. The revenue itself has been in this respect only an index and a consequence of the growth of our national wealth,—of the sound active vitality of our prosperity. So far as this index is to be trusted, growth has become slower. No one can dream that it has been stopped by the fact of arrival at maturity. It must, therefore, have been arrested either by disease or by decay. It is our hope and belief that the former is the true cause, and that acute, and not chronic, disturbance of the healthy functions of the body politic is evinced by this arrest of development. But it must not be overlooked how readily the one may pass into the other; nor must it be forgotten how serious are the symptoms which, as we have again and again pointed out, indicate that unless, in some particulars, treatment and regimen are changed, John Bull has trouble before him.

It is dangerous to mistake analogy for argument. That which is, perhaps the most powerful element of the rhetorician is logically of no value. But so long as men use speech, and are not driven by stress of business to think in telegrams, illustration will form a main part of language. It is no less true that both analogy and illustration are often guilty of misleading the mind. When we see part to resemble part, we are apt to conclude that the whole resembles the whole. It is impossible to reflect on the subject without becoming aware that in our impersonation of countries and states, in our representation of masses by individuals, we tend towards a confusion of ideas. We see that to a certain stage the analogy holds; we see that by-and-by it breaks down; we do not trouble ourselves to work out the idea thus arrested to its legitimate conclusion. Thus we may compare the wealth, the confidence, the good fortune of the country to that of the sturdy squire whose lineaments are so familiar to our comic draughtsmen. John Bull sometimes pulls a long face, but we never conceive it possible that he should come to great disaster. Countries never die, we think, and John Bull, if down in his luck to-day, will be himself again to-morrow.

But let us take home to our reflection a remark of one of the most philosophical writers

who has ever used the English tongue, the author of the work called "Ancient Law." "The unit of ancient society," says Mr. Maine, "was the family." The individual was unknown as a distinct element regarded by the lawgiver. Let us carry out the observation, and seek analogies for the prosperity or decadence of a nation in the history of a family. We shall now find the parallel to be exact. Then comes home the knowledge of the dilapidation that may be effected by the prodigal son; of the weight on the family property of numerous jointures, charges, and mortgages; of the maintenance, generation after generation, of a corporate existence, while the head of the house is either increasing in wealth, and advancing in social influence and position, or gradually and unwillingly being dragged down by a combination of errors and mischances of his ancestors, his children, and his kinsfolk, from which he is unable, by his best efforts, to extricate himself. Such is the position of an independent state amid the sovereignties of Europe; and with such an illustration before us we can scarcely close our eyes to the importance of the service that the labour of each class renders to the welfare of the whole community, and to the peril and disadvantage that the failure of a single industry, the beggary of a single craft, causes to the entire nation.

This pause in growth is a warning that we shall do well to take to heart while as yet the mainsprings of the national welfare are untouched. We have suffered no material evil since the arrest of our cotton supply,—none at least but such as comes within the ordinary chances of the more or the less advantageous. Our losses and gains have been, for the most part, either upon paper or amongst ourselves. The nominal or selling value of much of our property has been unduly diminished. This makes little difference to the holder unless he seek to sell. Even in that case the nation is only a nominal loser. Our loss in 1866 and 1867 has not been deprivation of what we possessed, it has been simply cessation of production. We have not wasted large sums in war, we have not lost accumulated capital in foreign loans or in ill-advised speculations. We have failed to set the "drudging goblin" of the nineteenth century his annual task. We have not extended the rich frontier of the kingdom of steam. In ordinary trade there has been ordinary activity. We have eaten and drunk, housed and clothed ourselves much as usual. But we have done little for the future; little in the way of making our estate more productive by a present outlay; been content with the magazines, and roads, and ports that we found to our hand, and increased our possessions accordingly, little or none. In our defences, indeed, we have made some progress, though slow, and even in this particular rather theoretically than materially, rather by experiment than by armament. This is a state of things that we cannot safely allow to continue. The active rivalry that obtains in the social community obtains also in the community of nations. It is not by exhausting the resources of the country, in order to maintain a disproportionate force, that a nation secures any real advance. The opposite is the case. In the development of national wealth, in the true and evident sense of the term, lies the secret of national power. In the direction of the energies of the workman to the exercise and to the mastery of his craft, and not to the tinkering of the laws, is to be sought alone the maintenance and the restoration of that pre-eminence which the British craftsman has so long enjoyed that he has forgotten that he must labour to maintain it. The good sense of our working classes is, we rejoice to believe, awakening to this important truth. Very often are their actions such as ought to put to shame many of their self-elected guides and interested friends. They have another step to take in the present year, and we shall never be surprised if they take it before their political guides have finished their debates on its possibility. No one can mix much with the producers of labour without becoming aware of the strong instinctive demand for improved education. If the wisdom of Parliament fail to give us workmen's schools, it may be that the co-operative instinct of the workmen may put their legislators to shame. Of one thing we are sure, and that is, that it is only necessary for the real producers of labour, whether by the sweat of the brow or the wasting of the brain; whether by hammer, axe, tool of iron, or subtle quill, to become fully aware of the great revolution which is now going on in the field of labour, to know what the working classes of Germany, of Belgium, even of France, are actually doing in this respect, in order to come to the front in the bloodless battle, and to show that the men among whom the steam-engine and electric telegraph were born are not about to allow themselves to be distanced by those who owe their great mechanical and social progress to English origination.

PROFESSOR G. G. SCOTT ON EARLY ARCHITECTURE IN BRITAIN.*

THE subject of the architecture of Pre-Norman England,—that is to say, of England (exclusive of Wales and the counties occupied by the Britons), between the arrival of Augustine in 596, and that of William of Normandy in 1066,—a period exceeding by ten years the interval between the reigns of Edward III. and Queen Victoria,—has been held by some to be involved in such utter obscurity as to leave it uncertain whether any such architecture existed, or, at least, whether we have any means of ascertaining what it was; and yet no period of history is, perhaps, more replete with accounts of the foundation of cathedrals, monasteries, and churches. The cause of this is clear. The churches of this period were, no doubt, frequently of timber; but, of whatever material, were subjected,—first to the destructive effects of the repeated devastations of the Danes, and subsequently to the greater architectural ambition of the Normans which led to a perfect mania for reconstruction. The consequence is, that we have no cathedral or great abbey or church remaining of this period, and have to content ourselves with such evidences of their style as may be gleaned from among ordinary parish churches for the most part in rural districts, and consequently of a humble class.

The historical notices of the erection of churches during the Anglo-Saxon period are more frequent than descriptive.

On the arrival of Augustine, he found the Church of St. Martin, Canterbury, already used by the Christian Queen Bertha. This was, no doubt, a Romano-British structure. He found also a second, but in ruins; and this he made the nucleus of his metropolitan cathedral. He constructed also a third, afterwards called by his own name. We know, too, that in his day were also founded the cathedrals of Rochester and London; and there is no reason to doubt that all of these were of stone. I am not aware that we hear anything more, in Anglo-Saxon days, of St. Martin's, or that we have any description of St. Augustine's, but we have a strong light thrown on the subsequent history of the cathedral up to the Norman Conquest in the writings of one Eadmer, a singer at the cathedral, who wrote early in the twelfth century.

Recapitulating the account of its having been erected by St. Augustine on the site of a Roman church, he proceeds to say that in the days of Archbishop Odo, in the tenth century, the roof had become so decayed as to require renewal; that Odo took the opportunity of increasing the height of the walls, and that the work occupied three years. He also tells us that a church dedicated to St. John the Baptist had been added by Archbishop Cuthbert in the eighth century near the east end of the church for baptisms, &c. He says that the church escaped the destruction threatened by the army of King Sweyn in 1011; but was subsequently burnt down by accident, and remained in ruins until rebuilt by Lanfranc.

He, further, gives a very clear description of the church, from which it appears that it was built in some degree on the model of the Basilica of St. Peter at Rome. He minutely describes the eastern altar space as greatly raised above the general level of the church, and having beneath it a crypt or confessionary, made in the likeness of that of St. Peter at Rome. He further describes an oratory and altar of St. Mary at the western end raised on steps, behind which was the pontifical throne. Also two towers, the one on the north and the other on the south side of the nave, projecting beyond the aisles, and containing chapels.

Professor Willis, in his admirable history of the cathedral, gives an able dissertation on its plan at this period, showing how precisely the description of the eastern arrangements agree with those of the Basilica of St. Peter, but that the Chapel of the Virgin at the west end must have been a western apse, like those so common in Germany, and of which we have an earlier instance in the ancient design for the arrangement of the monastery of St. Gall, supposed to be of the eighth century. Eadmer confirms his account by saying that he can answer for its correctness, for he saw the ruins himself when a boy at school.

From the above description we learn, first, that a Roman model was taken; secondly, that the church was of stone or brick; thirdly, that it had aisles; fourthly, that it had both an eastern and western apse; beneath the former of which was an extensive crypt, called a confessionary, as containing the tombs of confessors.

The additional church of St. John was clearly a baptistery; and Professor Willis thinks that Archbishop Odo's addition to the height of the walls was a clearstory.

I am not aware that we have any information as to the cathedrals built by the companions of Augustine (Mellitus and Justus) at London and Rochester; but it is unlikely that they would be otherwise than of cognate plan and materials; while, curiously enough, there continues to this day at Rochester, and continued to the seventeenth century in our own St. Paul's, equally as at Canterbury, a crypt beneath the elevated sanctuary, no doubt the lineal successor and representative of those erected by these missionary bishops, in imitation of the great basilica at Rome, whence they had been sent to evangelize this distant region.

A few years later, Paulinus, another Roman missionary, succeeded, under circumstances very similar, in converting to Christianity Edwin, king of Northumbria, who, while receiving instructions preparatory to his baptism, built a temporary church of timber at York; but subsequently erected, around the same, and under the instructions of Paulinus, a larger and nobler church of stone, which was completed by Oswald, his successor. Here, again, we have still remaining the choir-crypt,—the probable successor of that of the original church, and as some say, containing a relic of its actual structure. Thus, we have the two metropolitan cathedrals distinctly recorded as erected of stone by their first bishops.

Bede also relates that Paulinus built a stone church, of beautiful workmanship, at Lincoln, the walls of which remained at the time he wrote, though, by some mischance, it had lost its roof. It is clear, however, that some of Paulinus's churches were of timber, and, later on, we find St. Aidan and St. Finan,—missionaries from Iona,—erecting a cathedral of that material in the Island of Lindisfarne "*more Scotorum.*"

Shortly afterwards, however, a church was built, after the monastic rule of Lindisfarne, but of stone, at Lastingham, in Yorkshire; where, again, we find the choir crypt,—the successor of the original one,—remaining to this day. Still, in the seventh century, we have a more minute account given us by Bede of the works of Benedict Biscop, in the erection of the monastic church of Monk Wearmouth. This church he built of stone, "according to the manner of the Romans, which he had always loved." He built, also, the church at Jarrow of the same material, and the existing remains of both I shall have presently to describe. So much did he consider himself a follower of the Roman manner, that he went, over and over again, to Rome, to procure ornaments wherewith to decorate his two churches. This was about 670 and 680.

The successor of Benedict Biscop is said to have sent architects to Naitan, king of the Picts, to make him a church of stone after the manner of the Romans.

About the same time we find St. Wilfrid thoroughly repairing, glazing, and "washing whiter than snow," Paulinus's Church, at York, and building two of great splendour (according to the ideas of the times), at Hexham and Ripon.

The former is described by a contemporary writer in extatic language, as "supported by various pillars and porticoes, adorned with a marvellous length and height of walls, and with passages of various turnings; nor was it ever," he adds, "heard that such another church was erected on this side the Alps. He tells us, also, of its ornaments of gold and silver and precious stones," and of its altar, clothed with purple and silk hangings. This church remained, though in a damaged state, till the twelfth century, when the Norman prior describes it in very similar words to those used by the old Saxon historian. He speaks of the crypts and

* See p. 70, *ante*.

subterranean oratories, the walls of great height, "divided into three distinct stories supported by polished columns, some square, and others of various forms," of the "capitals of the columns .... And "the arch of sanctuary," as "decorated with histories and images and different figures carved in relief in stone and painted, displaying a pleasing variety and wonderful beauty." The body of the church was "surrounded by aisles and porticoes, which with wonderful art were divided above and below by walls and winding stairs:" above he describes "galleries of stone," by which "a vast multitude of persons might be there, and pass round the church without being visible to any one in the nave below."

Of the church at Ripon, the contemporary historian says that "he [St. Wilfrid] erected and finished at Ripon a basilica of polished stone from its foundations in the earth to the top, supported on high by various columns and porticoes."

This church was founded by Odo, archbishop of Canterbury, in the tenth century, "reduced by wars and hostile incursions to a deserted and ruined solitude."

All the buildings of the erection of which I have briefly enumerated the records, were founded within a century of the arrival of St. Augustine. Within the same century (about 680) we have reason to believe was erected the church at Brixworth, in Northamptonshire, which still remains in a fragmentary state, but, as I shall presently show, with sufficient proofs of its having been founded on the plan of a Roman basilica, with an aisled nave and an unaisled choir, an apsidal and aisled sanctuary raised high on a vaulted crypt. This church was but a humble dependency of the great monastery of Peterborough.

I would not have fatigued you with these documentary accounts, had I not felt it desirable to prove the importance of these earliest temples of our English Church. Cathedrals, churches, and monasteries were, in fact, built throughout the length and breadth of now Christianized England. The more important buildings were all, no doubt, of stone; many of the humbler ones of timber.

But times of trouble were at hand: "there is a time to break down" as well as "a time to build up;" and what the Christian English had built, the Pagan Northmen too often overthrew. Thus in Alfred's time (though in the reign of his predecessor), we find Croyland, Peterborough, Ely, and other monasteries ruthlessly destroyed, and in some cases they lay desolate for very long periods of time, though in others they were speedily restored.

At a later period, a new impulse was given to building by the introduction of the Benedictine order, and we find monasteries either founded or re-formed on this rule throughout the kingdom.

Two descriptions of such Benedictine churches I will quote, the first being from the history of Ramsey Abbey, in the time of Dunstan.

The architect's name is for a wonder mentioned in this case: it was Ædnoth, and he came, as it would seem, from Worcester. The church is said to have had "two towers rising above its roof. The smaller of these towards the west, in front of the Basilica, presented a fine spectacle from a distance to those entering the island. The larger one was in the centre of the square, standing upon four columns connected by arches stretching from aisle to aisle." This laconic description seems to indicate a church with aisles, transepts, central tower, and a western tower. It may be, however, that the word "*ala*" signifies not an aisle, but merely a transept.

The other church I will refer to under this head is the Cathedral of Winchester, as rebuilt in the reign of Edgar. It had been founded in the days of St. Birinus, the first missionary to the West Saxons, about 635. Athelwold, made Bishop of Winchester in 963, was a great restorer of churches, which had been devastated by the Danes. Among those restored by him may be especially named those of Ely and Peterborough. He renovated and partly rebuilt his own cathedral at Winchester, which was rededicated in 980. It is described by Wolstan, in a poem addressed to the succeeding Bishop St. Elphege. He speaks of the "lofty walls and solid aisles, and various arches; the many chapels which so distract the attention, that a stranger is at a loss which way to turn, seeing doors open to him on all sides." He mentions also the "fine roofs of intricate structure, and the brilliant variety of the fabric." St. Elphege seems to have added a new apse, with "secret crypts, where secret recesses lay on every side, the structure of which supported the holy altar, and the venerable relics of the saints." "A sparkling tower," also "that reflects from heaven the first rays of the sun." "It has five compartments pierced by open windows, and on all four sides as many ways are open. The lofty peaks of the tower are capped with pointed roofs, and are adorned with various and sinuous vaults, curved with well-skilled contrivance. Above these stands a rod with golden balls, and at the top a mighty golden cock, which boldly turns its face to every wind that blows."

Again, however, came the ruthless Northman, and destroyed church after church throughout the entire course of his desolating march.

No former incursion probably had been so fatal to architecture as that of Sweyn. Its very success, however, brought its own cure; for his son Canute, being allowed to succeed to the English throne, not only became Christian, but devoted himself with exemplary piety to repairing the devastations which the sacrilege of his father and himself had perpetrated. He not only repented, but brought forth works meet for repentance; so that the last half-century of the history of the præ-Norman England, is replete with accounts of the restoration and building of churches.

The foregoing notices are sufficient to show that throughout the continuance of the Præ-Norman English Church buildings were constantly being erected of considerable dimensions and sometimes of great intricacy, and even of some degree of splendour of design; and that the more important of these were uniformly of stone, though the humbler ones were often of timber. It further shows that the architectural style of these buildings, as well as the internal arrangement of the churches, was intended to be an imitation of the Roman buildings of the same period.

We will now proceed to inquire into the existence and character of any remains of buildings of this period.

Of the more important structures, I may say at once that nothing remains; the ambitious character of the Norman builders having led them to reconstruct on a larger scale all the cathedrals and great monastic churches, excepting, indeed, that *one* which they found in course of re-erection at Westminster, and which was designed in their own style.

There exist, however, throughout the length and breadth of the land, remnants, and, in a few instances, large portions, of buildings of a wholly exceptional character; not assignable to the Norman or any other of the well-known styles which have prevailed in England, but evidently of earlier date. They are clearly not early Norman; for, with the single exception of the round arch, they have nothing in common with the specimens of that style erected in the reign of the Conqueror, but are clearly of a style quite distinct from them. In one instance, we have a tower known to have been erected in the days of the Conqueror in juxta position with the remains of a church in this more ancient style; and in many other instances we have Norman features in connexion with these mysterious remains, and to every eye asserting the entire diversity of their art. In some instances, again, as at Monk Wearmouth, Jarrow, Brixworth, and Deerhurst, the remains of this style are on the sites where churches are recorded to have been built in Anglo-Saxon days. These remains correspond in character with buildings represented in Saxon illuminated books. They evince in many instances evidence of having been built in rude imitation of the Roman works of these periods, though in some instances they seem also to suggest the imitation of timber construction.

The most obvious rules of induction, then, point to the conclusion that these are the remains of buildings of Anglo-Saxon date.

The leading characteristics of these remains (though not all of them to be found in every instance, and probably varying with the date) are as follow. The frequent decoration of the external walls with pilaster strips, as is so common in Early Italian churches, and afterwards in Germany; the bonding of these by alternate vertical and horizontal stones; the imitation of this mode of bonding in quoins where no such strips are used, and in the jambs of doorways and other openings, excepting where Roman brick is made use of, which is of frequent occurrence; the jambs of doorways running square through the thickness of the wall, without recessed orders, and the door itself hung against the inner face of the wall; the frequent use of a kind of pilaster on either side both of doorways and archways, the impost moulding sometimes breaking round, and sometimes stopping against, them, and a continuation of the pilaster going round the arch; the occasional use of triangular heads to doors and windows; the use of what are called baluster columns, or short pillars, turned in a lathe, not unlike Elizabethan balusters, bulging in the middle and ornamented with a number of mouldings of trifling relief, such as turners of all ages delight in (these are used for the division of windows, and other purposes); the windows, which are usually set high in the wall, are often equally splayed within and without, and the arches sometimes more splayed than the jambs, and slanting upwards like a bonnet; a very abnormal kind of mouldings, unlike those of any other style, and generally a very strange archaic look in the whole of the work, which makes one conscious of being in the presence of the works of men in a very pristine state of civilization, the style having little or no relationship to those Mediæval buildings with which we are familiar.

I ought, also, to mention the frequent use of tall, narrow towers, unbroken, or nearly so, in their vertical outline, either simply quoined with the long and short work already mentioned, or with their surfaces diversified by pilaster strips and string-courses, the intervening surfaces being usually built of rubble and plastered. The belfry-windows are often of two lights, separated by a baluster or other form of pillar set in the middle of the wall, and bearing a transverse bracket of stone, to enable it to support the whole thickness of the wall. Such towers are clearly imitations of the Italian campanile, though in a rude form. They occasionally have oblique strips as well as the vertical pillars and horizontal strings, which suggest the idea of an imitation of timber-work; at other times the pilasters are united by arches.

It is not easy to describe the general plans of churches, as the remains we possess are too scanty to be generalized upon. Some had aisles, some transepts without aisles, many had neither. One, at least, has a central tower without transepts; and at least one a central tower with transepts. Some had apsidal chancels, and some had the square end. The towers, in a great majority of instances, are at the west end. The walls are in some cases by no means low, and the naves occasionally of greater width than in usual in village churches of later periods.

What forms were made use of for the pillar we are but imperfectly aware. One of the notices I have quoted speaks of their being square and of other forms. The few which remain *in situ* are of the former kind, mere fragments of wall: but at Worth Church there are, in the jambs of the chancel arch, half pillars, 2½ ft. in diameter, with very perfect capitals; and certainly an entire pillar of this form must have suggested the demi-column. At Canterbury there are two round columns brought from Reculver, which are clearly of Anglo-Saxon date. Their capitals are of the most remarkable form.

I will make special mention of a few Præ-Norman churches and fragments of churches as specimens; but to do more in a lecture such as this would be both tedious and unprofitable; for, however interesting the study of the primæval architecture of our race, it must be confessed that, while in general plan these churches are the progenitors of those we think worthy of imitation, we cannot venture to say so much of their details.

I exhibit a plan and a general view of Brixworth Church, enlarged from drawings kindly lent me by Mr. Roberts, who has given the church the most careful study. We have documentary evidence of the erection of the church by the abbots of Peterborough, about 680. Being near the ruins of a Roman station, it contains much Roman brick.

The chancel, or rather the sanctuary, was apsidal, with a surrounding aisle, and raised high on a crypt of corresponding plan. This sanctuary and aisle open by three arches into a choir of 30 ft. square, and this, I think, by a single arch, into a nave about 30 ft. by 60 ft.

This nave had arcades opening into either aisles, or, as Mr. Roberts thinks, into cubicula or oratories, the foundation of which he has found. The arches are turned in Roman bricks, very strangely used; a steep skewback being formed for their springings to reduce the angle of convergence, and so moderate the thickness of the mortar-joint, which, in arches of such a depth, would have been inconvenient. The nave and choir have had a clearstory, the windows of

which have arches of Roman bricks. This is thought by some to be a later addition, from the reduced thickness of the walls; but of this I feel far from certain. Mr. Roberts suggests it as possible that the wide nave was again subdivided by arcades; but I confess I much doubt this.

To this original church a western tower was subsequently added, in which the Roman brick does not take so prominent a place; and later still, though still in Anglo-Saxon days, a very large round stair-turret was added, west of the tower.

The alterations introduced when the tower was added are clearly visible, especially the introduction of a triple window with baluster pillars, looking from the second story of the tower into the church.

I exhibit also a plan and other drawings of the till lately ruined church on the Castle-hill at Dover. Here, again, Roman bricks have been largely used, both for quoins and arches, and some other parts. The church is cruciform, with a central tower, the transepts being narrower and lower than the nave. Wide and lofty arches open into the tower on the east and west, but those on the sides were, no doubt, low and narrow, and consequently were replaced by larger ones late in the twelfth century. The chancel is square-ended. The windows are of a very large size, and about equally splayed without and within, and had wood frames for the glass, the grooves for which were quite distinct. The main doorway seems to have been that on the south side. It has stone jambs of long and short work running square through the wall, the door having been hung against the inner surface. The arch is of brick, and a pilaster strip flanked it on either side and run round the arch. Similar, on a small scale, was a ruined doorway, found in the north transept, and now restored precisely to its original form. Similar, also, are the windows of the tower, which were treated like doorways, with a shutter within. At the west end stands the ancient Roman pharos, from which was a communication to the church, both on the floor-level and also above. The latter had a doorway in a very perfect state, which opened into a western gallery, of which I found the holes for the insertion of the timbers. Beneath this gallery, on either side, was a small window, which, for want of room for an arch, was made square-headed, with splayed wooden lintels, of which the exact impressions of the ends were found, giving its precise form.

The tower arches have the pilaster strips on either side, each of its western face, and continuing round the arch. Each has a stone impost with very abnormal mouldings.

Several very curious balusters of Caen stone were found among the ruins. They appear from their freshness to have been always *internal*, and I fancy formed parts of a screen under the western arch of the tower, of which some foundations apparently remain. Externally, the quoins are partly of Roman brick and partly of long and short work, with very large stones. This is, perhaps, the most nearly complete of all our Præ-Norman churches. There is no clue to its date. Some call it a British church: some say that it was built by Eadbald, the son of Ethelred, about 640, and others that it is of a much later period, to which opinion I confess that I incline.

Another nearly complete church is that at Worth, in Sussex. The plan may be said to be that of the Dover Church, omitting the central tower and adding an apse. The transepts, like those at Dover, are small, and their arches low and narrow; while the chancel arch assumes almost majestic proportions. The transept arches (now much mutilated) had the pilaster strip, both to jambs and arch, with a double square impost of massive proportions. The chancel arch is more artistic in its treatment, having a large demi-column in either jamb, 2 ft. 6 in. in diameter, with a regularly-formed, though plain, capital; while, instead of the pilaster, a smaller semi-column is placed against the face of the wall on either side, and indirectly carried round the arch in the form of a square projection. The arch itself is square in section, and runs, without break, through the thickness of the wall. No doorway nor window of the original date remains. The walls of the nave are about 25 ft. high, and are divided at mid-height by a large string-course, above which the windows were probably placed. The angles have pilaster strips in long and short work, and similar strips are placed at intervals along the walls reaching up to the mid-height string-course, all of them standing on a continuous base of two massive courses of stone. The half height string-course of the nave is continued round the transepts, as are eaves course, and run across their gable ends. The chancel was externally dealt with much as the nave, though a little less in height. This church had no tower, and, as a curious commentary on the fashionable opinion that the Anglo-Saxons nearly always built of timber and their successors in after-times of stone, we find a timber tower of the fifteenth century added to the stone church of Saxon date!

At Bradford, in Wilts, a very complete church has but recently been discovered; having previously been so surrounded by buildings that its character was unnoticed. I give drawings of it, made by my friend Mr. Irvine, a zealous antiquary, who has also sent to the Academy a cast of some uncouth sculpture found there. The church consists of a nave and chancel, and has every characteristic of Anglo-Saxon work strongly developed.

At Jarrow-on-the-Tyne, the chancel of the Saxon church remains. It has few characteristic features. The windows are of a very pristine form, in this case with no external splay, the jambs of upright stones with horizontal stones for imposts, and arches cut out of single stones. They have been walled up at a very early date to a certain thickness from the exterior with very small perforations,—some circular and some more elongated,—in the filling up wall. This, I fancy, was done as a means of defence. There is one doorway, which is a plain arched opening running square through the wall, the door having been hung as usual against its inner face, and the jambs formed of large stones facing the reveal. There are some signs of an apse having existed, but of this I cannot speak with any certainty. A tower was erected between the nave and the chancel—as I am informed by a local antiquary—in the reign of the Conqueror. The nave has long since perished, but in the walls of a modern erection on its site were found, used as building material, about twenty baluster columns, some 2 ft. 3 in. high and a foot in diameter, of which I exhibit some drawings. This was in all probability the very church erected by Benedict Biscop, and in which the venerable Bede worshipped.

At Monk Wearmouth are the remains of the other church of Benedict Biscop.

This church was burnt, as also was that at Jarrow, by the Danes in 867, and both remained in ruins till about 1074, when (or a few years later) both churches were re-roofed and restored to their sacred use. It was at this time that the tower at Jarrow was erected.

The most interesting portion of the church at Wearmouth is its western end. From this projects a tower evidently of Anglo-Saxon date. This tower has arches on three sides of its lower story, which, till recently, were not only walled up, but almost buried in the accumulated earth.

In September, 1866, they were excavated, and the western entrance opened out by the local Archæological Society, with the help of Mr. Johnson, architect, of Newcastle. The side doorways were found to have monolith jambs, 6 in. wide on the face, which are notched into a continuous cill, and support massive imposts, from which the arch springs, with very bold voussoirs. The western entrance, which is 6 ft. 4½ in. to the springing and 4 ft. 8½ in. wide, has an arch springing from massive abaci 10½ in. thick, which are supported by baluster-shafts very similar to those found at Jarrow, two of which occupy the width of the wall on either side, and stand upon jambs each of a long and a short stone, the reveal of which is curiously sculptured with entwined serpents. This is decidedly the most remarkable doorway of this kind yet known. Above the doorway runs a band or string sculptured with animals and edged with the cable mould. At the same time, the two lower stories of the tower were found to have originally formed a gabled porch,—two windows, of construction very similar to the side arches above described, having been stopped up in the end of the church by the conversion of this porch into a tower. Baluster-shafts have been discovered in the internal jambs of these windows.

At Jarrow, amongst many curious fragments discovered, is a stone in which is sculptured, as a continuous ornament, a long row of the balusters represented on a miniature scale as if they were so established an architectural element as to be imitated just as arcades and windows are in Gothic architecture as a mere ornament.

The church at Stow, in Lincolnshire, contained extensive remains of Anglo-Saxon work, but of doubtful date. The church was founded about the time of Paulinus, as a cathedral for the Bishops of Lindsey, but was burnt by the Danes, as it is believed, in 870. It was re-founded about 1040. The tower arches and transepts are in one style, but of which date is doubtful. I confess I think the preponderance of evidence is in favour of the earlier date. Foundations have been discovered of aisles to the nave, clearly of the same age with the transepts. The older parts show everywhere marks of fire, and the transepts have been heightened in Saxon times; and, as I should think probable, at the time of the second foundation. The present nave and chancel are Norman. I have been enabled by the kindness of my friend, Mr. Pearson, to exhibit drawings and photographs of this venerable church, once the mother church of Lincolnshire.

There exist several crypts beneath chancels, which are of this date. Among these, besides the fragmentary remains at Brixworth, I will mention one not generally known, at Wing, in Buckinghamshire. It is of excessive rudeness, being built only of very rough stone; but it is notable for the completeness of its plan, being apsidal, with two ranges of piers, and as having remains of the two doorways through which it was approached by steps from either side of the chancel arch.

The apse in this case is polygonal, with pilaster strips up its angles, and parts of the nave are of præ-Norman date, and show clear evidence of its having had aisles.

The crypt at Repton is famous for the finished and decorative form of its architecture. I give a drawing of it.

The crypt at Lastingham is not of Saxon date, but its Norman successor. The original church was destroyed by the Danes. Its foundation I have already noticed.

The most numerous of the Anglo-Saxon remains are the bell-towers. These have almost always the peculiar characteristics which I have already noticed. Their number is so great that it would be impossible to enter into any enumeration of them. One of the best known, perhaps, is that of St. Benet's, Cambridge. It has pilaster strips up each angle, with long and short work. The string-courses are merely square courses: each story recedes a little in width. The belfry windows are double, divided by a mid-wall baluster and bracket; and there are plain windows again over their spandrels. The intermediate surfaces were plastered. The tower arch is of strangely rude design. The tower of Trinity Church, Colchester, is peculiar, as being, to a great extent, of Roman brick.

Earls Barton tower is the most remarkable of its class, uniting the profuse use of pilaster strips, diagonal strips, arched strips, long and short work, baluster columns, and other characteristics of the style. I have noticed here that the majority of the arches are so in form rather than in construction, some being cut out of the solid, some built up with horizontal courses projecting one over the other, and others, again, formed by a number of flat stones set on edge one behind another, and the arched opening cut through them all.

Barnach Tower is something like it, though with less variety,—a more Cyclopean look. I give some excellent drawings of it by my friend Mr. Graham Jackson.

The tower at Barton-upon-Humber bears considerable resemblance to that of the Earls Barton, though with less profusion of the usual characteristics and less rudeness of construction. This tower is rendered remarkable by having attached to it a very large and lofty western porch, apparently of about the same date.

Among the most remarkable towers, however, is that at Sompting, in Sussex. Its most striking characteristic is, that its sides are each gabled, and it is roofed like the typical steeples on the Rhine. I am told that an instance of this also existed at Flixton, in Suffolk. The details at Sompting are somewhat elaborate.

The tower of Clapham Church, in Bedfordshire, is chiefly remarkable for its great height and plainness. The chancel arch, of great simplicity, here remains, as did one window of the chancel (a small bonnet-arched opening like some in the tower itself) till destroyed recently by a stupid builder.

One more building, I must notice. It has often been mentioned that our Anglo-Saxon forefathers built largely of timber; and, strange to say, after the lapse of more than eight centu-

ries, we have one of their timber structures remaining!

Edmund, king of East Anglia, who had been slain by the Danes in the ninth century, had been canonized; and on the invasion by Sweyn, more than a century later in 1011, his relics were removed from Bury St. Edmund's to London for security. On their being carried back in 1013, an old register of Bury informs us, "he was also sheltered near Aungre, where a wooden chapel remains as a memorial unto this day."

This chapel still exists at Greensted, near Ongar. It consists of cleft oak-trees grooved and tongued together by their edges, and let into grooves in horizontal cills and heads. The exterior of the trees was exposed on the outside of the church, the sapwood of which having long since perished, the furrowed and gnarled heart is now seen, presenting a most ancient and interesting appearance. It is more than thirty years since I visited this most venerable relic. Since then it has been repaired; but I trust that its antiquity has not been compromised, and that it will long remain as a relic of the royal saint, and a visible exponent of the old Anglo-Saxon verb *getymbrian*—to build.

I must not, however, go on enumerating specimens: they will be found in great numbers in several publications, as Mr. Bloxam's "Principles of Gothic Architecture," Mr. Parker's "Glossary," Britton's "Antiquities," and elsewhere; while very interesting articles have been written on them by Mr. Freeman, Mr. Ayliffe Poole, Mr. Paley, and others. In my own practice I every now and then fall in with minor specimens not mentioned in books, and often walled up and hidden from view, to make way for later work.

Fragments of Saxon crosses are frequent. They are usually covered with that platted ornament so frequent in the illuminations of the period.

In proof of their early age, we often find them imbedded, as mere material, in Norman walls. In St. Peter's, at Northampton, I found the base of one of the Norman columns to be wrought out of a piece of one of these crosses; and at Jarrow there are several portions of them built into the tower, which was itself erected in the reign of the Conqueror.

Though this form of architecture spread over a period of some 470 years, we have little or no means of classifying it into distinct division of date. It would seem that the system of rapid change which characterizes the centuries succeeding the tenth had not then commenced, and that much the same manner of building pervades long spaces of time.

On a conjectural view of the case, one would look, perhaps, for the following divisions:—

1st. From the arrival of Augustine to the earlier devastations of the Danes.

2nd. From the time of Alfred to that of Dunstan.

3rd. The period of the general establishment of Benedictine rule up to that of the devastations of the Northmen under Sweyn.

4th. That from the accession of Canute to the Norman conqueror.

Mr. Freeman divides the style into three:—

1st. The direct but rude imitations of Roman work, of which Brixworth is an instance.

2nd. The developed Saxon manner, with its high towers, its pilastered strips, and suggestion of imitated timber-work, as at Earls Barton, &c.

3rd. That in which Norman features are introduced or anticipated.

I may mention, however, that we have proofs, as at Deerhurst, which is said to have been rebuilt in 1056, and elsewhere, that the style remained with little modification to the last.

I shall show you in my next lecture (in which I propose to treat of the earlier Norman buildings, erected by those who actually came over in the days of the Conqueror or of his companions) that the two styles overlapped; that there were pre-conquestal Norman and post-conquestal Saxon buildings. I will, however, at present detain you no longer; and if I have trespassed upon the rules of the Academy by giving a lecture more on *archæology* than on *art*, I must apologize on the ground that I have treated of our own early efforts at architecture; of buildings whose bold and archaic rudeness was so strangely accompanied by exquisite skill in other arts,—as in illumination, in embroidery, in jewelry; and the contemplation of which, to use the eloquent words of Mr. Freeman, "Should raise a thrill of patriotism in the heart of every genuine Englishman," . . . . "whose barbaric grandeur breathes in its fulness the spirit of England's ancient days of freedom and isolation," and reminds us "of the long roll of our native saints and heroes; of holy bishops and no less holy princes; of Ina, and Alfred, and Athelstan; of Bede . . . . and the martyred Alphege; of Harold and Gurth, and Leofwine; of St. Wolstan and Abbot Frederick; of the battle-axe of Hereward and the martyr-block of Waltheof; and all the glorious train of the 'England of saints' ere yet she bowed beneath the yoke of a foreign lord."

THE DRAINAGE OF LAND.*

Soils that require Drainage.

MR. STEPHENS, in speaking of this subject, gives it as his opinion, arrived at by dint of long and extensive observation of the state of the agricultural soil over a large portion of the country, "That not one farm is to be found throughout the kingdom that would not be much the better for drainage."† Fully sharing in this opinion, it may be said that lands absolutely requiring drainage are, all peat mosses, clays and tenacious soils, and others of a more porous character holding water, such as silts, sands, gravel, and chalk, and all soils in which springs exist; in fact, all lands of every description whereon the produce cannot be consumed at any season without detriment to the stock feeding thereon or without injury to present or subsequent produce. Drainage is very advantageous to grass land in improving the quality of the herbage and the healthiness of the stock. It is true that in many cases the result appears to be at first unfavourable. This cannot be better explained than by quoting from the prize essay on the management of grass land by Mr. Robert Smith, who observes: "The remark, that land has been overdrained, is familiar in many districts; hence it is inferred that the pastures have been spoiled. Now this inference is inapplicable to the draining: the soil being changed for the better, the food of the aquatic grasses having been removed they become dry and inactive: it is true the existing grasses become more like stubble than grass, but having so far changed the soil, it is equally necessary to change the herbage by other agents, such as suitable top-dressings to sweeten and increase the herbage, that the truly important branch of close-feeding may be effected. The pasture then becomes gradually improved, and Nature supplies her indigenous grasses, suitable to the then improved character of the soil, as the aquatic or other spurious grasses, in the absence of their food, decline."‡

On the same subject another authority says,—"Low, wet, clay soils may be converted into good pastures by draining them well; and the improvement thus produced is so great, that judicious draining in such soils is the most profitable investment of capital.§

Let it not be supposed that the indiscriminate drainage of all pastures and meadows is here recommended. There is an old saying,—"Let well alone;" and when a field is superior to any in the neighbourhood, is yielding large supplies of food, and the stock are healthy, it would be folly to experimentalise upon it. Judgment and discretion in the application of drainage are as necessary as in every other alteration and improvement.

Time of Year to Drain.

The time chosen for putting in drain-pipes must be regulated by the cropping and other circumstances; but it may be stated, that the drier the weather the better for the drainage. In clay soils, the drying action of the air and wind on the trenches allows the soil to contract and form the crevices necessary for the rains to escape to the drains. Experienced drainers recommend the month of February for the work, and that the pipes, receiving a light covering of soil, should be left open through March, if it be drying weather, by which means the cracking of the soil is much accelerated, and the complete action of the drains advanced a full season.

In laying drains in a silty soil, the worst time to choose is when the ground is full of water; the feet of the men working in the grips cause the silt to purge, so that it is impossible to get a good and even bed to lay the pipes on; and even when laid they are extremely liable to choke, by the loose silt in the trenches being washed in by the water which pours out of the ground. If the pipes are laid when the silt is dry, or only slightly wet, the bottom of the trenches may then be taken out hard and firm, and the ground, owing to the effect of the drainage, will never again become so charged with water as to make them liable to be stopped up; and even should the ground, from any exceptional cause, be drowned, after the soil in the trenches had once become settled and consolidated, there would be no danger of the water washing it into the pipes, as it would find its way to them through the regular crevices or canals. A few years since the author had occasion to lay some large drain-pipes at a depth of 5 ft., under a road, for carrying away sewage, the soil being silt, and at the time very full of water. In fact, the "soc" was within a few inches of the surface, and it was only with the greatest difficulty the pipes could be laid, the water pouring in out of the sides of the ground, causing the bottom of the trench to purge and be all alive. The pipes were ordinary stoneware socket pipes, and the joints were made good in the sockets with well-puddled clay. In the course of a very short time the ground on either side for a very considerable distance became dry; in fact, a large pool of stagnant water more than 50 yards away dried up, and has remained so ever since; but from time to time the surface of the road kept settling in places, and this went on to so great an extent that it became necessary at last to open out the trench and examine into the cause: when it was found that the pressure of the water, soaking out of the sodden silt, had forced an opening through the puddled joints into the pipes. In many places the silt had eaten away all the clay, leaving the joints bare, and the pipes were found to be nearly full of silt, and had to be taken up and relaid. Such an instance has never happened in the author's practice when at the time of laying the pipes the silt has been free from water.

Whether, then, for a tenacious or a porous soil, it is better, where possible, to choose a dry time in preference to a wet one. The only advantage of wet being to make the digging better and to give the workmen a guide to level by, which may be accomplished by other means to be explained hereafter.

Depth.

Perhaps on no question relating to drainage has there been a greater diversity of opinion than as to the depth at which drains should be laid below the surface. The two great drainage engineers, Mr. Smith and Mr. Parkes, who may be considered the founders of the modern system, entertaining very different views. Mr. Parkes advocated drains 4 ft. and 5 ft. deep, and from 10 to 13 yards apart on stiff clay, and 14 to 19 yards on mixed soils. Mr. Smith's opinion was, and he carried it out most successfully in his practice, that distances of from 6 to 8 yards, with depths of from 2 ft. to 3 ft., have been found, over extensive tracts, and in soils of various texture, to effect complete thorough drainage for agricultural purposes; and that he had invariably found from experience that when distances beyond 8 or 10 yards had been adopted in compact soils, there had not been a perfectly uniformly dry condition of the soil, especially when rain had recently fallen. Another great authority, Mr. Spooner, considered, — "That in the generality of soils drains are not safe at a depth of much less than 3 ft., and that they may to greater advantage be laid at a depth varying from that to 4 ft.; but he had not seen evidence to prove that a greater depth than this is attended with such advantage as to sanction the increased incidental expenditure." Mr. Stephens, in endeavouring to determine the proper depth, remarks that a drain is not a mere ditch for conveying away water; were it only this, its size would be easily determined by calculation or experiment, of the quantity of water it would discharge in a given time. But the principal function of a drain is to *draw* water towards it from every direction; and its secondary purpose is to convey it away when collected. The depth of a drain, he further remarks, must to a certain extent be regulated by the culture of the ground; that for ordinary ploughing and cross furrowing it may safely be assumed that a greater depth than 10 in. is never reached, but in subsoil and trench ploughing the ground will be disturbed to a depth of 16 in. or 18 in.; that the drawing portion of the drain ought to lie below this, and

* See pp. 40 and 54, *ante*.
† "Book of the Farm," vol. i.
‡ "Journal of Royal Agricultural Society," vol. ix.
§ Rham's "Dictionary of the Farm."

in a tenacious soil 1 ft. is sufficient to allow for it, so that in such a soil a depth of 2 ft. 6 in. is the minimum, and when the subsoil draws slowly the depth should not be less than 3 ft.

Having quoted the opinions both of engineers and agriculturists of the greatest experience, the various points to be noticed in determining the depths will now be considered, which, after all, must be regulated by the special circumstances of each case, rather than by any fixed rule.

The object to be kept in view in determining the depth of any drain, as already stated, is that it may be placed so deep that, while it rapidly draws and conveys away the surplus of the rain-fall, it shall also be so situated as most effectively to promote a circulation of air, and allow the moisture to be drawn up from the sub-soil below the drains to the roots of the plants in dry weather. Where no special circumstances arise to prevent it this object seems to be most effectively attained where there is a covering of 3 ft. on the top of the drain pipes; and this may be taken as a safe depth to lay drains, whether in tenacious clays or silts and more porous soils; and 8 yards to 9 yards in the former class of soils, and from 10 yards to 12 yards in the latter, is as great a distance as the drains can drain the water from the soil with uniformity and regularity.

A depth of less than 2 ft. 6 in. or 3 ft. does not allow of sufficient space for the proper filtration of the water. Earth has a wonderful facility of absorbing from water any organic matter which it contains, and this has been taken advantage of in many towns, to purify the sewage which is allowed to flow over the surface of the land, and to gravitate through it to the under-drains, from which it passes away clear and pellucid. But there must be sufficient of the filtering medium, or else the water will escape to the drains, together with the greater part of the matter held in suspension. If two drains, the one very shallow and the other at a proper depth, were watched after a heavy rain, it would be seen that the water running from the shallow drain would be muddy and turbid, while that from the deeper one would be clear and bright. This is especially the case in a field which has been recently manured; and thus a great part of the virtue of the manure is carried away to the drains. Shallow drains are also very liable to choke in silty or sandy soils, by the fine particles of earth washing into them.

On the other hand, it must be borne in mind that any increase of depth adds considerably to the expense of the labour; and if it does not add to the efficiency, is only waste of time and money. There may be special circumstances where drains may be advantageously laid at depths from 4 ft. and 6 ft.: for instance, supposing a mouldy, deep soil, 4 ft. in depth, resting on an impervious subsoil; in this case the drains ought to rest 3 in. or 4 in. in the subsoil, making them more than 4 ft. below the surface. By neglecting to descend a few inches in certain soils, many of the benefits of drainage may be lost. Again, where springs occur it is often necessary to lay the drains at considerable depths, and to resort to special means of getting rid of the water, as by boring down through an impervious soil to the porous stratum below. But these are cases which fall within the province of the engineer, and need not, therefore, be further alluded to.

But if it be waste of money laying drains too deep, it is worse than useless laying them too shallow. Many hundreds of acres have been drained with the pipes scarcely out of reach of the horses' feet, and have now to be re-drained. An authority writing on this subject, says,—So generally is the practical part of the operation diffused, that every manager of land conceives that he knows the whole subject of draining so correctly that he will commence his operation with the utmost confidence of success; and this confidence has caused much money to be expended in draining that has in great part been ill-directed. Were the efforts of ignorance in draining confined to the squandering of money, they might be compensated for by superior management in the other operations of the farm; but unfortunately the sinking of valuable capital in injudicious draining cripples the means of the farmer, and at the same time prevents his reaping all the advantages derivable from drainage itself.*

Shallow drains have been laid under the erroneous idea that the water enters the pipes at the top, and flows immediately through the soil into the drain; the fact being that the water enters the pipes at the sides or bottom, and a field may be drained with tiles laid at a depth of 9 in. or 1 ft., and yet the surface be wet and poachy. A striking instance of this came under the author's notice a short time ago. Having occasion to lay a main drain across a grass field for the purpose of conveying away water from an adjoining site, it was found, on opening the trench, that the field had been under-drained with pipes, laid at a depth of about 9 in. below the surface. These drains were perfectly dry, although the surface of the field was so wet that the water oozed up over the boot-soles. The trench was cut 3 ft. deep, and as soon as a depth of 2 ft. was reached, the water began to flow freely out of the sides of the trench, and continued to do so for more than a week, during which time it remained open, the land for a great distance on each side becoming dry and firm. The soil was a clayey silt, of a class that receives very great benefit from drainage; but here money had been completely thrown away, which, if it had been expended under the guidance of skill and experience, would have been of the greatest service.

Although it is recommended that 3 ft. should be considered as a minimum depth under ordinary circumstances, there are cases where a drain laid 2 ft. deep will prove more effective than one laid at a greater depth. The depth a drain is laid must always depend on the outfall; and there are many cases in fens and marsh land, where the state of the outfall ditches and drains will not allow of a greater depth than 2 ft. The pipes *should never be laid so low* that their ends are buried in the water in the ditches into which they empty; such a practice is simply laying pipes for the purpose of soddening the land with water instead of draining it. It completely stops the whole circulation of air, and arrests all the benefits to be derived from a properly laid drain. A drain laid 2 ft. deep, and free at the end, is far more effective than one laid 3 ft. with the outfall constantly under water.

The outfall should always be the first care in draining, and, where it is deficient, means should be taken for improving it by scouring out and deepening the ditches. This may involve works on adjoining lands, and is more a matter for a civil engineer than an agriculturist; but it may not be out of place to remark that special enactments of the Legislature have given powers to carry out works on the lands of adjoining proprietors where necessary to procure outfalls, and have also given great facilities for mutual operation where the works may be beneficial to several adjoining estates.

The outfall of the drains, where they empty into the ditches, should be constantly inspected, to see that they are free, and not stopped with weeds and earth. The ditches ought to be regularly scoured out and cleaned once at least every season; and the master of the farm should make it his own peculiar business to inspect the outfall-pipes, to see that they are clear. It is a good plan to lay the last tile of the main drain on a flat paving tile or brick, and to place a small iron grating before the mouth of it, to prevent the vermin from getting up; and too much care cannot be bestowed in keeping these outfalls clean and free.

Direction and Fall.

Drains should always be laid to run with the fall of the land, and not across it. A different theory was held for a short time by some drainers, but practice has proved, what theory would teach, that the drains should fall with the land, the only exception being in the case of springs. A consideration of the subject will show that the water has the least distance to travel to the drains when laid in this manner, and, when there, will get away most quickly. For, supposing the strata to have the same inclination as the surface, and the drains to be laid 30 ft. apart, the water will of necessity flow in the direction of the strata, and a part of it must, therefore, travel 30 ft. if the drains be laid to run across the slope; but, on the other hand, if they be laid to run with the inclination, the water will flow from the centre space between the drains in both directions, and thus have only 15 ft. to travel, or only half the distance.

When the inclination of a field is in one direction, the drains should be laid parallel throughout the field, terminating in a main laid at right angles to them across the lower end of it; and if there is a ditch at the upper end they should be continued through the headland to it, which will allow a free current of air to pass through them. In an undulating field the main drain should be carried up the hollow part of it, and the minor drains brought in parallels down the inclination to it.

Where a field is in one plane, and level throughout, it is better to lay the main across the centre of the field, letting the drains radiate from it at right angles towards the sides. The object being to get rid of the water quickly, the less run it has through the small pipes the more rapid will be the discharge, the friction in the mains being much less than in the smaller drains. And so, in a very large field, it is never desirable to lay the smaller drains of a greater length than 200 yards. Some engineers allow 300 yards as a maximum length, and instances have come under the author's observation where 2-inch pipes laid in a clay soil in lengths of 20 chains have been in effective working order for the past ten years, and will possibly remain so as long as the pipes last; but, under ordinary circumstances, 10 chains may be taken as the maximum safe working length.

The fall of the drain must be guided more by the shape of the ground to be drained than by any arbitrary rule. Where the surface of the ground slopes, the drains should be laid parallel with the slope, and have the same mean inclination; but where the field is a horizontal plane, it is better that the drains should be laid perfectly level than that a fall should be acquired by laying them shallow at one end, and deep at the other, a practice recommended by some of the early drainers. The advantage gained by a fall, thus acquired, is neutralised by the varying effect the difference of depth must have on the uniform drying of the ground. The distance the drains are apart is determined with reference to the depth; therefore if the drain be laid shallow at the upper, and deeper at the lower end, the distances must either be too great at one end, or too little at the other.

Fall is not *necessary* to the safe working of drains. By the action of gravity, water is attracted towards the earth's centre, and travels towards that point until its progress is arrested by some impediment. Water varies from more solid substances in that all its particles are free to act. If a piece of wood be dropped from a height, it falls bodily, and retains its shape, the cohesion of the particles of which it is composed counteracting the action of gravity on each individual particle, and allowing it to act only on the mass; but the particles of water have so little cohesion, that every particle is free to obey the influence of gravity; and therefore if a body of water be allowed to escape from a vessel, each particle immediately acts on its own account, and seeks the lowest place it can find; that is, the nearest point to the earth's centre. So when the rain falls on the land, in obedience to this law, it soaks downwards through the earth; still pursuing this law, it is attracted to the drains, and in the haste to reach a lower place, each particle pushes the others on till the drain is emptied. Fall only assists this action, because all falling bodies acquire a velocity in proportion to the height from which they fall; and so the greater the fall the greater the velocity, and the greater the velocity the greater the power to overcome obstacles, and the more certain and rapid the discharge. Thus, while fall is a great advantage, and even a necessity in drains which convey water having matters in suspension, as in town sewers, in enabling the water to keep the drain free from deposit, it is not absolutely necessary to the discharge of clear water, or for land drains laid at a proper depth; and many miles of drains have been laid that are now doing their work well, which have not an inch of fall.

A good working inclination for a drain is 1 ft. in 4 chains, which is equal to about ½ in. in a length of 10 ft.; and for an open outfall ditch, 4 ft. in a mile will be enough to enable the water to flow away with sufficient rapidity to keep the drains clear and prevent injury to the land.

Where pipes are laid level, or where only a very slight fall can be obtained, the main should, wherever possible, be laid lower than the small drains, and the end pipes should always tip, or be laid at a greater inclination than the others, in order to assist in drawing off the water.

The connexions of the drains should never be made at a right angle, but the smaller pipes ought always to be made to enter the mains with a curve, or at a very obtuse angle. The reason for this is obvious. When one current of water impinges on another at a right angle, it

* "Book of the Farm," vol. i.

causes a stoppage in both, and hinders the flow: an eddy is thus created, and any heavy matter held in suspension is precipitated, having a tendency to choke the pipes; whereas, if the smaller stream has the same direction given to it as the larger, by the pipes being made to join the others with a curve, the united currents flow on together without interruption. Experiments made in sewer-work resulted in ascertaining the fact, that when equal quantities of water were running direct, at the rate of 90 seconds, with a turn at right angles, the discharge was only effected in 140 seconds; whilst, with a turn or junction, with a gentle curve, the discharge was effected in 100 seconds.*

Irregularities in the cutting of the grips and in the form of the pipes are far more injurious to efficient drainage than want of fall. It is of the first importance that there should be no hills and holes in the bottom of the grips, but that a regular inclination, when there is a fall, should be given throughout the whole length of the drain. In selecting pipes, those should be chosen which are evenly burnt and which are not warped or twisted; and care be taken in laying them in the ground that the ends properly fit. There is a very great difference in the manufacture of pipes, owing either to the want of care and skill on the part of the maker or the nature of the clay of which they are made; and those yards should be selected which turn out true and straight pipes, although it may involve either extra cost in the purchase or extra leading.† W. H. W.

FROM PARIS.

THE cold weather having ceased, the works of demolition are being doubled in activity for the prolongation of the Rue de Rennes to the Place St.-Germain-des-Prés, and for preparing the junction of this street with the Boulevard Saint-Germain. Already the block of houses formerly bounded by the Rues Bonaparte, Gozlin, Childebert and d'Erfurth has disappeared. On the opposite side clearance has been made as far as the Rue de l'Égout. The Mont Parnasse Railway Station is now visible from the Place Saint-Germain-des-Prés, and the *coup d'œil* is magnificent, especially as Saint Germain-des-Prés is on an eminence of considerable height.

The works for the new park of Mont Souris progress rapidly at the side of the Bièvre. Two railways, in open cutting, traverse the new park, viz., the line from Paris to Sceau and the Paris circular railway. To the west of the park are to be constructed, as we stated at page 714, vol. xxv., the enormous reservoirs, similar to those of Menilmontant, to receive the waters of the Vanne for the further supply of Paris. At the south-east angle of the new park are to be placed open and covered riding and training schools for the cavalry. At the south, on the Boulevard Jourdan, in the gorge of a bastion, new barracks have been erected for the *employés* of the *octroi* and their families. Lastly, one of the points of observation of the meridian of Paris passing through Dunkirk, Montmartre, the Observatory, and Perpignan is at the south, and in the park itself.

Works are extensively carried on for the Boulevards drags, starting from the Place Enfer, Mont Parnasse, continued as far as the Boulevard de l'Hôpital, and Mouffetard, between the Gobelins and the Place d'Italie; also the Rue Monge, and the Place Fer à Moulin, which will be an important thoroughfare. The ancient Faubourgs Saint-Jacques and Saint Marcel have already been pierced for these arteries some months since. The last works for the circulation of the Rue Monge are finished and the street opened, thus affording a convenient communication between quarters which were formerly separated more by the difficulty of access than by distance.

One of the most curious hotels of ancient Paris, is the Hôtel de Sens, at No. 1, Rue du Figuier, in the St. Gervais quarter, dating from A.D. 1500, and built by order of Tristan de Salazar, Bishop of Sens, as we now see it. Before the construction of this hotel, there existed near the river, on the Quai des Célestins, a hotel, of the same name, which was constructed in the fourteenth century, and purchased by Charles V., to form the Hôtel Saint Paul, the irregular *ensemble* of which was composed of several buildings and hotels, such as those of Saint-Maur, Pute-y-muce, &c. In 1622 the building was sold, and up to the year 1790 was the property of the Archbishop of Paris. It is now occupied by MM. Lesage and Paignard, manufacturers of sweetmeats. The recent demolitions which have taken place around this remarkable building, led to fear that the fine front, with its two towers, would be sacrificed; but this ancient dependence of the Hôtel Saint Paul is be preserved. The neighbouring space left vacant by the demolition of the Ave-Maria Barracks, is to be converted into a market. The Rues des Barres, Du Figuier, and Du Fauconnier, are to be widened out, or partly destroyed. At the corner of the Rue du Fauconnier there may be seen a niche, with its socle finely sculptured, on which was placed a small statue of the Virgin. Below is inscribed,—AVE MARIA. This is all that remains of the ancient Convent of Ave Maria, dating from the thirteenth century.

In the twentieth arrondissement a new hospital is to be constructed, so as to serve a district composed of a portion of Belleville, La Courtille, Menilmontant, and Charonne. The façade of the monument is to be parallel with the façade of the new mairie of the twentieth arrondissement.

The New Opera House began early to "pay its footing" in fire. On Sunday, the 19th ult., a fire broke out in the new building at the extremity of one of the couloirs leading to the Salle. The fire, which it is presumed was communicated to a tarpaulin screen by a stove chimney serving to heat the *ateliers* of the modellers, was put out at once by the *pompiers*, with a few buckets of water. An arch blackened by smoke and flame shows what proportions the fire would have acquired had it not been speedily extinguished.

On the Place du Château d'Eau, a vast promenade has been laid down in bitumen, corresponding to that already made at the right of the entry of the Boulevard du Prince Eugène, the dispositions of the latter *promenoir* being symmetrical with those of the former. Each contains four rows of young plane-trees, planted with every care, and calculated to give shade next year. Not less than 200 trees are employed in this portion alone. The site formerly occupied by the ancient fountain now re-erected at La Villette abattoirs, has been levelled, and the Place du Château d'Eau will in a short time assume its architectural proportions.

* Sanitary Report, 1842. † To be continued.

FROM GERMANY.

Berlin.—The works connected with the new National Gallery are steadily progressing. The foundation-stone was laid without any public ceremonial by Professor Strack, the architect from whose designs the building is being erected.——A "Victory," by Rauch, has lately been unveiled near Babelsberg, the residence of H.R.H. the Crown Prince. Three steps of Camenz granite lead to the pedestal, which, together with the statue upon it, is of bronze, cast at Lauchhamm. The height of the whole design is about 40 ft.——The battle-fields of Düppel and Alsen are about to have monuments commemorating the victories of the Prussians in the Danish peninsula. They will both be Gothic, somewhat like our Eleanor "Crosses," and about 60 ft. high. The cost of the one at Düppel is estimated at about 5,800*l.*; that at Alsen at about 4,500*l.* They will be executed in sandstone, and ornamented with figures representing the various branches of the service.

Vienna.—Professor Ferstel has completed his designs for the projected Austrian Museum. It is in the Renaissance style, and the internal arrangements specially include the means of accommodating a school of art.——The "Concordia" Club is about to erect a new club-house on a site given to it by the Emperor. Messrs. Schachner & Detter are the architects, and the building will cost about 12,000*l.*——On the occasion of the unveiling of the Schwarzenberg Monument, Professor Dr. Hähnel, of the Royal Academy of Dresden, received the Leopold Order, as did also the architect, Mr. Schwarz.

South Germany.—Those who have visited Nuremberg, and remember the dilapidated state of the cloisters of the Carthusian Monastery, now used as the "Germanic Museum," will be glad to hear that the sums now collected warrant the immediate commencement of the much-wanted reparation. Old King Ludwig and others have sent contributions of 250*l.* and upwards, whilst the chief cities of Germany, North and South, have contributed to this national work.——The Committee for the Restoration of Frankfort Cathedral, lately partially destroyed by fire, call upon all natives of that city residing in foreign countries to subscribe and to collect from other Germans funds in aid of the Cathedral of the Kaisers.

GENERAL EXHIBITION OF WATER COLOUR DRAWINGS.

THE fourth "General Exhibition of Water-colour Drawings," as it is called, in the Dudley Gallery, Egyptian Hall, consists of 684 works, ninety of which are by ladies. While many eminent names are in the list of contributors, such as E. M. Ward, R.A., E. W. Cooke, R.A., W. Cave Thomas, H. Dawson, F. Dillon, Holman Hunt, with others to whom we will briefly allude presently, this exhibition serves to bring before the public a number of promising artists, and some more than promising artists, at present little known out of doors. The exhibition as a whole is very interesting; thoughtfulness and harmoniousness being observable in the majority of the pictures. Mr. Poynter exhibits the original drawing for his now well-known picture "Israel in Egypt." Mr. Yeames has a picture, "Exorcising" (87), the merit of which becomes more observable the more it is studied; and Mr. Marks one of the best drawings he has yet made. For manipulative dexterity parts of "Heliogabalus, High Priest of the Sun and Emperor of Rome 118-22 A.D.," by Simeon Solomon, are a marvel.

Foremost amongst works of the as yet less known artists we must place "Preparing for Guests" (49), and "An Eavesdropper" (154), by A. C. H. Luxmoore, for whom we prophecy a good future. Vicat Cole exhibits a charming landscape, "Evening Shadow" (283), and in the same department (75), by Geo. Mawley; "Luccombe Chine, Isle of Wight" (265), Frank Walton; "The Homeward Rookery" (323), M. F. Halliday; "Bettws-y-Coed, North Wales," John Ernest Croft; and several more, deserve the same adjective.

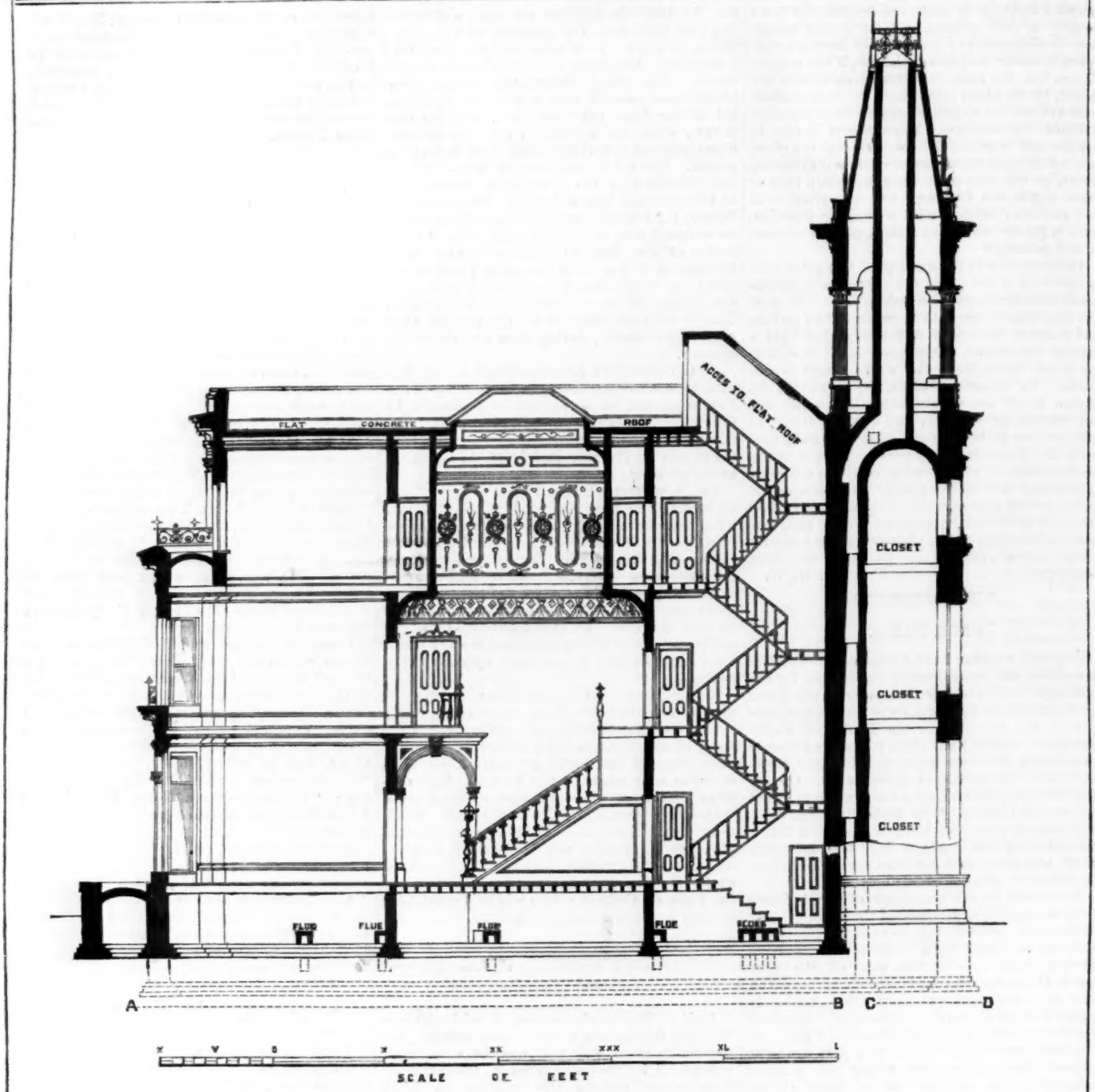
Amongst other noticeable works are "Calatafimi, the scene of Garibaldi's first victory in Sicily," Talmadge White (though over-hard); "A Midsummer's Night's Dream at Hampton Court" (353), Adelaide Claxton; Mr. G. Leslie's heads; and Mr. Donaldson's earnest works.

A RESIDENCE AT EASTBOURNE, WITH SMOKE TOWER.

THE Cliff, Eastbourne, of which we give three illustrations, is now in course of erection for Mr. William Earp, of Eastbourne, upon land leased from the Duke of Devonshire; Mr. Henry H. Vale, of Liverpool, recently elected a Fellow of the Institute, being the architect. The site of the house is commanding; it is about half a mile to the west of Eastbourne, on the way to Beachey Head, with a prospect of the English Channel, Pevensey, Hastings, and St. Leonard's; and is approached by a new road, made by shelving down the escarpments of chalk, and so forming a terrace upon the face of the cliffs. This road has been recently made from the plans of Mr. Wallis, the resident surveyor, under Mr. Currey, the architect to the Duke of Devonshire, who is the owner of the land here,—in fact, of the whole of the land upon which modern Eastbourne has been built.

Those who know Eastbourne only from recollections of seaside holidays in the "Old Town," with its quaint flint houses, and ancient church, say some ten or fifteen years ago, would be much astonished on visiting the Eastbourne of to-day, with its handsome villas, hotels, and promenades. The present Duke of Devonshire has greatly promoted this change, and Eastbourne now bids fair to become one of the most architectural of our watering-places. The house under notice will, when finished, be a conspicuous building, partly from its elevated situation, and partly from its dimensions and skyline, but the special feature to which we purpose calling attention is the absence of visible roofs and chimneys.

The magnificence of the view suggested to the proprietor the idea of having the roof finished flat, to serve as a promenade, and, in order to remove the objections arising from the contiguity of chimneys, it was arranged that the



"THE CLIFF," EASTBOURNE. SECTION; SHOWING SMOKE-TOWER.

smoke should be carried into a smoke tower, some 85 ft. high at the angle of the building, as shown in the accompanying perspective view.

The plan of basement, which we have engraved, shows the direction of the horizontal smoke tunnels; and the section represents the construction of the same, together with that of the smoke tower. On reference to these drawings it will be seen that the smoke from the ground and first floors is to be drawn downwards to the basement by the extracting power of the tower, and taken thence in a double tunnel, 100 ft. long, underneath the vineries and conservatories to the base of the smoke tower. In order to regulate the draft, a system of dampers has been arranged so as to give command over the flues, whether only one or several fires be lighted. This tower is also used as a ventilating shaft, the vitiated air from the apartments being drawn upwards to the flat roof of the house (from each room and closet just underneath the ceilings) by means of wall cavities, and then conducted across the flat to the shaft in the tower, which is divided by a wall into two parts, the one serving for the smoke, the other for the foul air. Of the efficacy or otherwise of the mode adopted we have not at present the means of judging. Smoke and ventilating flues from the stable buildings are also brought underneath the stable yard of the base of the tower, where they join the smoke shaft.

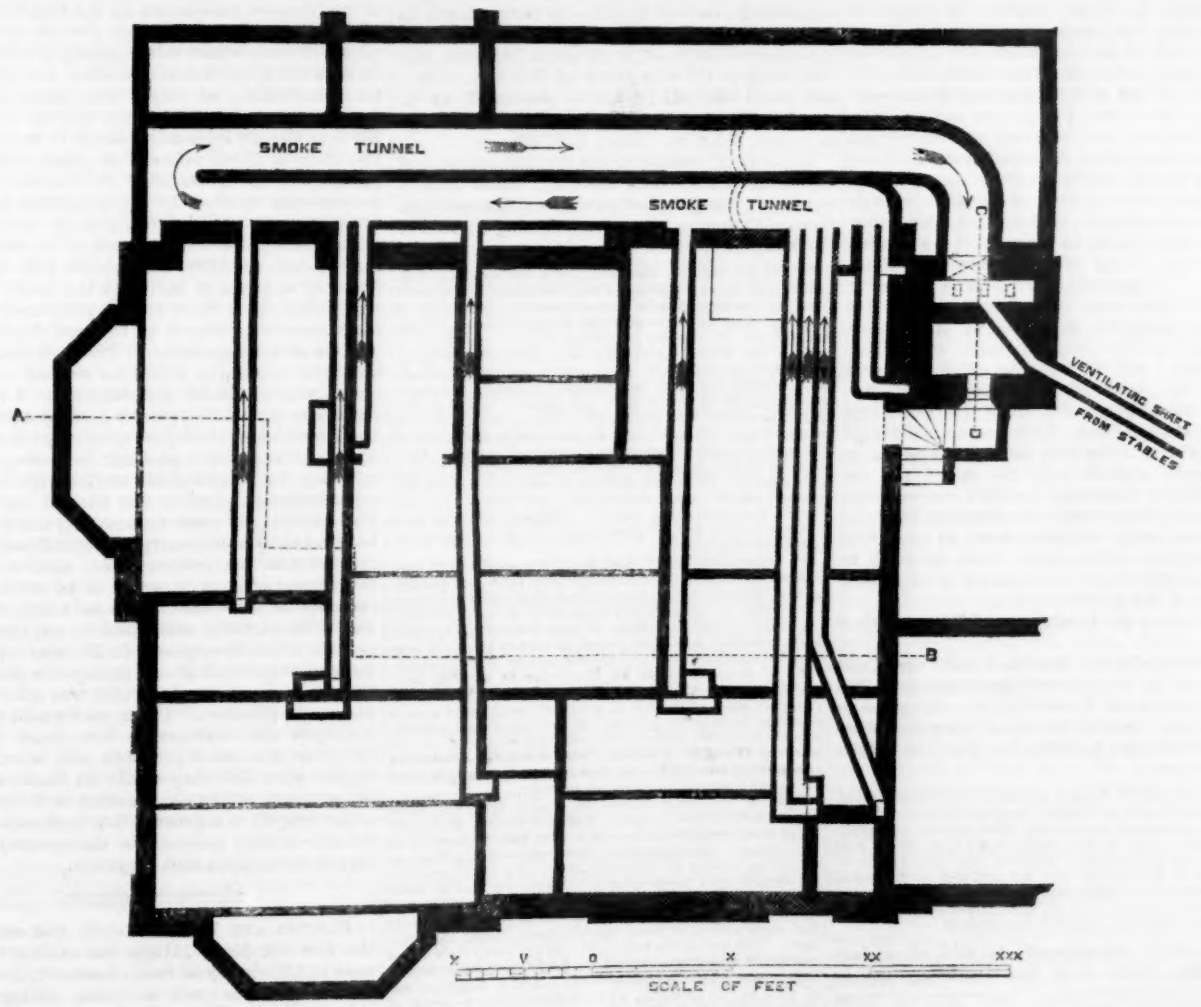
The main entrance to the house is by a large portico between the vinery and conservatory, with large glazed doors opening into them from it to the right and left, affording a view of the range of houses spanned by light iron roofs, with ornamental iron principals, and divided by glazed screens. The porch, vestibule, and hall under lantern light are to be paved with variegated marbles, with sunk avenues for strips of pile carpet to the various doors. The fireplaces of the rooms surrounding the hall are so arranged that the hall can be heated through ornamental metal grilles projecting into the hall and covered with marble tops. Steam piping is to be laid on throughout the halls and passages and attic story. There will be a Turkish bath and hot and cold showers upon the chamber floor.

The sloping nature of the approaches calls for careful treatment by terracing, so as not to cut off the views of the house, by running out the plateau upon which it stands too great a distance. This plateau has been formed by removing the top of the conical hill to a sufficient distance to receive the house, outbuildings and lawn, the gardens being placed at a lower level. The upper parts of the stabling and offices are seen in the perspective view.

The bay windows of the house open on a terrace with steps and balustrades, the same being laid with Minton's tiles. In order to admit of a wide range of view the bays have been constructed of large dimensions, being 18 ft. in the clear opening. These and other windows are to have balconies and crestings of ornamental ironwork, as indicated in the view. The materials of the buildings generally are local bricks, covered on the exterior with Portland cement. There is neither stone nor lead used throughout the works (excepting Portland stone for outside steps and landings); the interior piping is all of iron. The baths are of hard wood, screwed together and well painted.

An enclosed passage above the cove of the lantern of main hall leads to the various apartments on the second or attic floor; the servants' stairs are continued, as shown upon the section, to the flat roof, which covers the entire building. This roof is constructed of joists brick-grouted, concrete, and cement; the upper surface of flat being laid with falls to channels or gutters, which take the water to the down spouts. The cement which forms the top finish of the roof is of a special manufacture, found to answer the purpose in other buildings. The

"THE CLIFF," EASTBOURNE, SUSSEX. WITH SPECIAL ARRANGEMENTS FOR SMOKE AND VENTILATION.—MR. H. H. VALE, ARCHITECT.



PLAN OF BASEMENT. SHOWING POSITION OF SMOKE-TUNNELS.

arrangement of the rooms with regard to aspect has required consideration. Owing to the proximity to the chalk cliffs the heat in summer becomes intense.

The style adopted for the exterior dressings and interior decorations and enrichments may be called Anglo-Italian. Owing to the absence of the two leading features, viz., roofs and chimneys, the architect has had a somewhat difficult task to perform to produce a satisfactory architectural effect. As will be seen from the perspective view, he has designed the façades with strongly-accentuated grouped pilasters at the angles, finished at the top with acroterial terminations for skyline, the breaks being slightly pedimented.

Pressed bricks and stone being at Eastbourne very costly, almost all the buildings there are coated with Portland cement. The tower will form a belvedere, with open arches, and angle pilasters, leaving a space to walk round the circular smoke and ventilating shaft in the centre. The space not required for the smoke-flue on the lower stages is used for closets to the bedrooms and oven for the kitchen.

Provision is made for access to the top of the tower inside the ventilation flue, for painting the iron cresting and for repairs.

We shall be glad to hear of the success of the system adopted for heating and ventilating this house. Mr. Vale is fortunate in having a client with the courage to leave the beaten track. It is the more important, therefore, that every care should be taken to render the experiment successful. Whether or not, the heat of the smoke-tower might be further utilized seems worth consideration.

Mr. Charles Nash Foster, of Whitefriars, London, is the sole contractor; Mr. Taylor, the resident foreman; the works being carried out under the architect's superintendence.

THE SEWAGE QUESTION.

MR. SLAGG, in a pamphlet recently issued,* objects not only to the casting of town sewage uselessly into the sea, but to the combination of towns as proposed in the Thames Valley, for its distribution, and even to its concentration in single towns. Sewage, he considers, ought not to be accumulated into one unwieldy mass of fluid anywhere, but should be radiated from towns in several directions, and distributed to the soil by underground or subsoil pipes, or covered tile gutters rather, of a simple character, with serrated side openings, such as we have already described in the *Builder;* and these would require to be taken up every three or four years, by help of a ripping plough made for the purpose, and replaced for other three or four years as before; the sediment clogging them being ploughed into the soil on which it is deposited. Thus much difficulty as to the obtainment of sufficient ground for irrigation would be overcome, as in no one spot would a very large expanse of surface be required; and as building extended round a town, the irrigated suburban market garden, or farming ground, could be given up, and the sewage taken farther out in different directions around the town as might be requisite. Mr. Slagg's system may be called the individualizing by contrast with the generalizing; the radiating by contrast with the concentrating, on which so many minds are now, as he thinks mistakenly, at work. And there is much in Mr. Slagg's system to recommend it to serious attention at the present moment.

On this plan an inhabitant of Kingston thus writes:—

"Surface irrigation has been tried again and again, and is an acknowledged success. The Commissioners for Preventing the Pollution of Rivers, after visiting Norwood, Croydon, Worthing, Edinburgh, Carlisle, &c., gave the following report:—

'That at the public inquiry at Croydon all the witnesses, medical gentlemen, and others, agreed that the irrigation works were not injurious to health. That, with the exception of lands liable to be flooded, there seems to be no soil that will not serve the purpose. Between the light and blowing sands of Edinburgh, and the stiff clay of Norwood, are included all the differences of soil which can be met with in this country, but at both extremes we find the application of sewage attended with success.'

This, be it remembered, is said of surface irrigation. Now, what has Mr. Slagg got to support the claims of subsoil irrigation? Why, the solitary fact that, in 1855, a Mr. Wilkins, of Reading, tried it on a very small scale, and found it answer. So that, on the one hand, we have offered us surface irrigation, the success of which has been amply testified, and on the other subsoil irrigation, which can be called nothing more than an experiment. True, Mr. Slagg might say, 'Surface irrigation was at one time an experiment, and every great undertaking has been at first received with caution, if not with positive scepticism or ridicule.' But the question is, Are the ratepayers of Kingston and Surbiton willing to risk 25,000*l.* or 30,000*l.* in endeavouring to solve the agricultural problem,—which is the best way to dispose of our sewage?"

Mr. Baldwin Latham, C.E., vice-president of the Society of Engineers, and engineer for the public works of Croydon, has written a pamphlet* under the title of "The Purification and Utilization of Sewage; with Plans of the Croydon Irrigation Fields."

On the results of the utilization of sewage he says,—

"The great result to be arrived at in the utilisation of sewage is the prevention of the fouling of rivers; in short, the purification of the sewage before being turned into any stream; and upon this head the results are most satisfactory.

In the case of Croydon, the sewage of that town, after being utilised, is positively purer than the water supplied by some of the metropolitan water companies. . . . The results of the application of sewage, in an agricultural sense, are also equally satisfactory; indeed it is surprising what enormous crops are produced under the influence of sewage, and the great difficulty is what to do with the crops; they grow so rapidly, and the yield is so large, that it upsets all the preconceived notions of farming. Indeed, the only way in which sewage grass can be dealt with with certainty is the means of making it artificially into hay, and this the author has succeeded in doing, and is now about to submit the process to the test on a large scale."

In a paper read before the Society of Engineers in Exeter Hall, Mr. Latham remarked that 650 towns were now governed in their sanitary operations by the Public Health Act of 1848, and with great benefit to the various localities; and from a table which he held in his hand it appeared that, in the towns of Banbury, Cardiff, Croydon, Dover, Ely, Leicester, Macclesfield, Merthyr, Newport, Rugby, Salisbury, and Warwick, typhoid fever has been reduced at rates varying from 40 to 75 per cent., and phthisis at rates of from 41 to 49 per cent. Proceeding to examine the case of Croydon as one example in detail, Mr. Latham showed that the sanitary expenditure had been in the gross 195,000*l.*, and the saving in thirteen years as follows:—Funerals (less), 12,195*l.*; sickness prevented, at 1*l.* each, 60,974*l.*; value of labour of persons kept in health, 166,828*l.* Total, 239,998*l.*

Mr. J. C. Morton, who has the management of the Lodge Farm, near Barking, where experiments are being carried out by the Metropolitan Sewage Company, gives the following account of these experiments:—

"It is not only on the sand-plot at the north London outfall that the experience has been obtained. They have there, as you appear to be aware, obtained great crops of grass and vigorous plants of wheat, mangold wurzel, celery, and carrots, by the use of sewage poured over about an acre of the Maplin Sand, which had been brought up by barge and spread 30 in. deep over a contractor's yard. But, besides this, they have, since Lady-day, 1866, been tenants of 200 acres of light and gravelly land at Lodge Farm, two miles from the Barking outfall, and on this, by pumping apparatus, they can deliver sewage at the rate of 300 tons an hour. During the summer of last year about 60 acres of this land were laid out water-meadow fashion either on the ridge and furrow, or, where the slopes are greater, on the catch-water plan; and from 53 acres of Italian rye-grass sown on this land and watered with sewage in this way, we have during the past summer cut 2,480 tons of grass.

"I believe that, fairly read, the lesson taught us is, that 60 tons per acre (and the quantity taken from that portion of the land which was in good producing order was more than this), or 3,200 tons of grass off 51 acres of ordinary land may be obtained from 250,000 tons of sewage properly applied. And if we deduct 12 tons of grass per acre (say 700 tons from our area) for the natural and unassisted yield of this soil under an Essex climate, we shall have 2,500 tons of grass as the produce of 250,000 tons of sewage. It is plain that if a ton of good grass can be obtained from every 100 tons of London sewage, a handsome revenue will be yet obtained from what now runs to waste at the Barking outfall. That sewage-grown Italian rye-grass is admirable cow food we have had ample proof on Lodge Farm during the past summer.

Besides this large extent of Italian ryegrass, small experimental plots in wheat, mangold wurzel, and other crops have been sewaged; and I may add the results to this report, notwithstanding that we cannot attach so much importance to them because of the small scale on which they have been obtained. Eighteen tons of mangold roots were weighed off rather more than one-third of an acre, over which 1,100 tons in all of sewage per acre had been poured at three separate times during the summer. This was at the rate of 52 tons per acre,—more than twice the quantity obtained on fields close by, manured and cultivated in the ordinary way. And a plot of wheat (1 rood and 21 perches), which received three dressings of sewage when the land was dry in spring and early summer, yielded 15 bushels of grain, which is after the rate of 43 bushels per acre; while, surrounding this plot on two sides of it, 2 roods and 22 perches of similar land, in all respects similarly treated, excepting only that it had no sewage, yielded 18½ bushels of grain, or at the rate of only 29 bushels per acre.

I will only add that, having had the management of this farm during the past two years, I know the circumstances, and can vouch for the accuracy of this account of them."

The local board of Tunbridge Wells having petitioned the Home Secretary to institute an inquiry with the view to obtaining a provisional order to enable them to take land for the purpose of sewage irrigation, &c., under the Sewage Utilization Act, 1867, an inquiry has been opened by the Government inspector (Mr. Arnold Taylor) at the Town-hall. There was a strong muster at the opening meeting of members of the local board, of gentlemen whose lands will be affected by the scheme which the board wish to carry out, and of professional gentlemen; but of ratepayers there were not many.

At a recent meeting of the Southampton town council the surveyor was directed, on Dr. Watson's motion, to prepare a report as to the best mode of ventilating the sewers. This was only, Dr. Watson said, carrying out the suggestions of the officer of health and of the surveyor. The system of drainage that prevailed in the town was modern, but the ventilation of the sewers was overlooked. If the report of the surveyor were true, the matter required immediate attention, as the decomposition of the solid sewage created obnoxious gases which ought to have a way of escape without entering dwellings. In the day time, he believed, the quantity escaping was small, in consequence of the continual action of the sewers, but there could be no doubt that much escaped by night, and created various forms of zymotic disease. The remedy was very simple, the admission of fresh air into the sewers, which could be done at slight expense. Mr. Chipperfield said that if people's drains and closets were properly trapped there could be no complaint, and that through attention to this in his own house, he believed 10 in. had not entered since it was built. Mr. Sharp, gas engineer, proposed ventilating the sewers through the gas columns, and thus burning the gases as they rose.

Mr. T. Hoey has read a paper at a meeting of the Glasgow Association for the Consideration of the Sewage Question on his plan for the reservation of water-closet soil in air-tight boxes, and its removal by pneumatic pressure, and through the intervention of larger receptacles, to the country for utilization in the soil as manure. We have already spoken frequently of such plans, Mr. Hoey's, if we mistake not, inclusive. On his system, as he stated, "the deodorizing of matter was secured by an apparatus on the 'bird-cage fountain' principle, so connected with existing closet movements as to discharge the requisite quantity of sulphuric acid or solution of sulphide of iron into the basin along with the flushing water for the purpose of fixing the ammonia developed in the soil during the process of decomposition." He then explained how this apparatus would be worked and the quantity of sulphuric acid required. An intercepting tank could be placed directly under the lowermost water-closet, or a soil-pipe could be continued at a proper gradient for conveying the soil from the bottom of the vertical pipe tank to any convenient place at the back of the house. The emptying of these intercepting tanks would be effected by a cart carrying a cylindrical vessel divided into four compartments, each compartment being of such capacity as to contain the contents of one tank. Those compartments would be partially exhausted by air, through a process which he expounded. He also explained the *modus operandi* of conveying the soil from the tanks to the carts, which was effected by pneumatic pressure. The matter would then be conveyed and discharged into large central tanks on the same principle, and when these depôts were full they would be discharged by air pressure acting on the surface of the mass, and conveyed to a general depôt situated in a suitable locality selected in the country. We do not recommend such a system.

MASTERS AND WORKMEN.—On the evening of the 31st ult. Mr. W. Higgs entertained the persons in his employ in South Lambeth, about 500, including wives and children, sitting down. Afterwards Mr. Higgs, the Rev. C. H. Spurgeon, and two or three other gentlemen addressed the meeting at some length.

* The Principles of Town Drainage. By Charles Slagg, Borough Surveyor, of Kingston-on-Thames. London: Stanford, Charing-cross. 1868.

* Spon, Charing Cross, Publisher.

SCHOOLS OF ART.

The Nottingham School.—The annual meeting of subscribers to this school has taken place. We extract the latter portion of the report by the Head Master.

"The number of students who attended the school last year was 389—increase on the previous year, 113. Although we have nearly 400 students on our books, still, if all the artisans attended to whom a knowledge of art is essential, the number should be much greater. Yet, considering the populations of other towns in the United Kingdom, and the number of students attending their respective art schools, we would have our fair number, by comparison, if we only had 176 students. In the national competition the school received one gold medal, one silver medal, two bronze medals, and three Queen's prizes. All the schools in the United Kingdom (to the number of 117 schools) competed for 10 gold, 20 silver, and five bronze medals, and 33 Queen's prizes, of which the provincial schools obtained five gold, 11 silver, and 38 bronze medals, and 27 Queen's prizes. London obtained the remainder. There were 37 sets of works by students of this school publicly exhibited at the South Kensington Museum Exhibition last summer, the average number exhibited from each school being eight. In the Government examinations in freehand, geometry, model drawing, perspective, and mechanical drawing, held last March, 144 papers were successfully worked, of which thirty-eight gained prizes. There were also nine full certificates, three third-grade prizes, and two honourable mentions. Last year the Mayor of Nottingham's silver medal, for the best designs for lace, was awarded for the first time. There were also local prizes to the value of 25*l.* In conclusion, I beg to call your attention to the following extracts from the Report of the Government examiners, published by the Science and Art Department:—'Some manufactured silks which were exhibited with the designs made for them from the Dublin school, designs for lace from Nottingham, for carpets from Kidderminster, for wall papers and jewelry from Birmingham, woven fabrics from Glasgow, and furniture from Kensington, show how satisfactorily the work of these schools is acting upon the manufactures of the country.'

JOHN S. RAWLE, Head Master."

The Secretary then read the abstract of the general accounts as follows:—

Dr.	£	s.	d.	£	s.	d.
Amount due on mortgage				1,000	0	0
Accounts due on debentures	823	16	3			
Ditto on special loans	251	4	11			
Due to bank	589	14	5			
Due to tradesmen, &c.	391	1	11			
				2,055	17	0
				3,055	17	4
Cr.						
Amount secured on mortgage				1,000	0	0
Cash in Secretary's hand	10	17	9			
Accounts due to institution	56	14	6			
				67	12	3
Deficiency				1,991	5	1
				3,055	17	4

Mr. Rothera said it would be seen that there was a sum of 1,100*l.*, which was pressing very much upon the committee, to cancel which they must make an urgent appeal to the public. The 800*l.* or 900*l.* of special loans, which had been kindly lent, would no doubt be allowed to stand until they were in circumstances to provide for their repayment. In round figures the building had cost 7,000*l.* They had received in donations, 3,550*l.*, Government grant, 750*l.*, and they had effected a mortgage for 1,000*l.* The subscribers had fallen off, but owing to the special efforts of friends, the list had been increased during the past year, and the fees of the students had also been augmented, owing to their increased number. Their prospects would be very encouraging but for the pressure of the debt, which, however, had been so great that the town clerk, with his usual liberality, had put his hand into his pocket, time after time, to keep the committee from being sued.

A vote of thanks was accorded to the headmaster for the efficient manner in which the Institution was conducted, saying he was to be commended not only for the earnestness with which he engaged in the work of practical instruction, but also for the essential service he performed in teaching the general public to appreciate excellence of design when produced.

The annual meeting for the distribution of the prizes had previously been held. The prizes were distributed by Lord Edward Clinton.

The Birmingham School.—A meeting of a subcommittee of this school has been held in the council-room of the Midland Institute, to confer with a selected number of manufacturers on a subject described as follows in the circular convening the meeting:—

"The possibility of making the art-education to students in their institution more specially adapted to the manufactures of the town."

Mr. Jabet took the chair. A number of the leading jewellers and other gentlemen were present, and the conversation turned chiefly on the special requirements of the jewelry trade, which were explained by Mr. H. Payton and Mr. J. Bragg, the latter of whom read a paper of practical suggestions as to the kind of teaching required. He objected, amongst other things, to the preponderance of outline drawing in the school teaching, and insisted upon the advantage which would result from careful study of styles of ornament, aided by oral instruction and explanation on the part of the teacher. The meeting will no doubt exercise a beneficial influence. The circumstance that a particular trade has, for the first time, come forward to explain its wants in regard to art instruction, is in itself a hopeful sign. It is to be hoped that the manufacturers will attest their interest in the school by more liberal contributions to its funds.

THE EAST LONDON MUSEUM.

THE Lord President of the Council, the Duke of Marlborough, has consented to receive a deputation as to the East-London Museum Site Bill on Wednesday, the 13th inst. The late President of the Council, Earl Granville; Mr. Bruce, M.P.; the local Members; and others, have promised to attend. It is to be hoped the difficulty raised at the last moment to the final passing of the Bill in the House of Lords may thus be removed. A contract has been entered into by Government for the erection of the Museum, but the committee are still short of money for the completion of the purchase of the land, and appeal for subscriptions to those who see how valuable a Museum of Science and Art in the Bethnal Green district would prove. The land, of which a conditional purchase has been made, consists of 4½ acres, part of the Green itself. The Government have undertaken that the land not actually occupied by the Museum buildings is to be laid out and kept up as an ornamental garden, and that the Museum is to be open every week-day until ten o'clock in the evening.

ROYAL ALBERT HALL OF ARTS AND SCIENCES, SOUTH KENSINGTON.

WE learn that the plans of Mr. Wilson W. Phipson, C.E., have been selected for the ventilation and warming of the Albert Hall. To give an idea of the magnitude of the building, the heating apparatus for the hall alone will be composed of more than 27,000 ft. of 4-in. hot water pipe, arranged in coils, under the arena, galleries, and lower corridor, the fresh air from the outside being distributed amongst them by means of two fans, 6 ft. in diameter.

GATESHEAD-ON-TYNE AS A MODERN TOWN.

A PHILOSOPHICAL mind is justified in asking what Gateshead has been doing during the last few years appertaining to modernism. The mind that pictures marble or granite halls, Thespian temples, luxuriant gardens, airy and fragrant parks, absence of disease, and a decrease of pauperism, must not look to Gateshead for realization. The modern grandeur of Liverpool, Manchester, and even so close a neighbour as Newcastle, has not been fostered in Gateshead. The town is characterised by an absence of cultivated architectural taste, and, to a large extent, of architecture itself. The authorities do not aspire for public thanks, but rather for public condemnation. The local legislators are no enthusiasts, and, therefore, subjects of public importance are not hastily brought to a culminating point. The pervasion of patience and cautiousness in the council chamber is painfully shown in the matter of the Town-hall. For a period extending over nearly five years the contemplated Town-hall has been a staple question of discussion in the courts of the councillors. Many thousands of pounds have been spent in plans, excavations, and professional advice. Attempts were made to obtain a foundation; but, after a couple of thousands had been thrown away, the matter, as far as practical advancement, was left alone, and is likely to remain so, *in secula seculorum*. The clamorous voice of the ratepayers was raised, but unheeded; and, at the present day, Gateshead is without a Town-hall. Where is the modernism here?

Our picture of the loitering town might be very desponding; but space and respect will only admit of a few allusions. At the time when the ancient town-hall was demolished, the authorities had no place ready for use. The magistrates were without a court; the councillors were without a council-chamber; and the county-court judge was without a place of sitting. All these denominations of authorities were turned adrift without a place to exercise their "judicious" and "equalified" justice. They must have some place, and after a little or no consideration they hired a portion of the Queen's Head Hotel, and there to the present day justice is administered, with the preparations for a 1s. 9d. daily ordinary proceeding on the one hand, and the existence of the odoriferous fragrance of a stable-yard and the green cloth of a billiard-table on the other. The authorities work with an ingenious intellect. The justice-hall of a minute is transformed into the debating-chamber of the council, or the placid sitting of the county-court judge in the next. Thus from month to month and year to year have justice, corporative improvement, and county-court judgment been administered in Gateshead. Where is the modernism here?

Passing thoughts of the county police court, the entrance to which is by one of the lowest and most disreputable thoroughfares in the town, the public park, which has not a respectable tree or shrub in it, and the bad state of the new streets, are all suggestive of inquiry for modernism. Again, Gateshead is existing amid an unpleasant and perceptible increase of panperism. The union workhouse is on the eve of an enlargement, or perhaps a larger one may be built. The ratepayers are on the *qui vive* against any immense expenditure for a new workhouse, and they may well cry out, "Now is the winter of our discontent." From the early dawn of the last twenty years Gateshead has vainly tried to effect modernism. As positive proofs of the endeavours stand—the new quay, an expensive and unprofitable toy; the Gateshead Park, a cold and bleak wilderness; and the foundation excavations for the contemplated town-hall, objectionable, an encumbrance, and suggestive of heavy rates. The picture of Gateshead as a town of modernism and improvement might be more severely painted, but it can be summed up in the words of our Gateshead contemporary, that "Gateshead is, indeed, in a pitiable state." We say that modernism is the king of improvement, but where can such a phenomenon be found equalling the holding of a court of justice, a council meeting, and a county court sitting in a public-house adjoining a licensed billiard-room? The town is deep in debt; it is without a corporation public building; pauperism is on the increase, and disease is prevalent in the town: this is a gloomy picture, but it is not overdrawn. The authorities act with little spirit, and, unless we are gravely misinformed, very little judgment; every district has its two representatives in the council, and yet it would be difficult to find in the town a substantial public improvement.

OPENING OF THE NEW TOWN HALL, IPSWICH.

THIS handsome edifice has been formally opened to the public. The Cornhill façade consists of three stories, viz., rusticated basement, ground and principal stories, surmounted by a bold cantilever cornice and open balustrade, with enriched finials. The centre of this front is marked by a projecting open arcade, supported by Corinthian columns, over which, on pedestals, are four statues in stone, representing Justice, Learning, Commerce, and Agriculture. In the centre of these are the arms of the borough in alto-relievo. Above the crowns of the arches forming the arcade are three medallions, in which are placed sculptured heads of three eminent men whose associations with the town have long been celebrated in history,—Cardinal Wolsey, King Richard II., and King John. Above this façade rises a dome, surmounted by the clock-tower, which is 120 ft. from the ground, and in which is placed a large clock, by Dent, of London, with a striking bell of 16 cwt., and illuminated dials on the four faces. Balconies are provided for speakers in the arcade, from which they can address the public either on the Cornhill or in King-street. The stiff sky-line of the ridge is relieved by an iron cresting, with finials. The internal arrangements of the building include a sessions-court, with accommodation for magistrates, juries, barristers, &c.; council-chamber, offices for the local Board, committee-rooms, library, town clerk's room, town servants' room, record-room, offices of superintendent of police

and inspector of weights and measures, prisoners' cells, large kitchen and offices, &c. The total cost of the building, which has been erected from the designs of Messrs. Bellamy & Hardy, of Lincoln, will be about 16,000*l.*, exclusive of the cost of site, &c.

The floor of the entrance is covered with Minton's encaustic tiles, and from the centre hangs a bronzed gaselier. Directly opposite the main entrance is the sessions court, 38 ft. by 34 ft., and 23 ft. high from the floor to the dome. Both dome and ceiling are ornamented. The remainder of the ground story is occupied by offices for the local Board of health, committee rooms, a town servants' room, and a record room for corporation deeds and documents; this last apartment is fire-proof, with a floor of Portland cement.

On the right of the main entrance is the magistrates' room, 31 ft. 6 in. by 26 ft. 6 in., and 19 ft. high. A grand staircase leads to a vestibule through which one passes to the council chamber. The decorations of the hall, grand staircase, and vestibule are to be noted. The staircase is 32 ft. long by 24 ft. wide. The council chamber occupies about the whole length of the western side: the length of this apartment is 74 ft., the width 31 ft., and the height 26 ft. On the left of the council chamber is a library, 40 ft. by 31 ft., and 24 ft. high. In the mezzanine story are the town-clerk's room, grand-jury room, another record-room, &c. The basement comprises a police entrance from King-street, an office for the superintendent of police, a charge-room, stores for stolen goods, and police day-rooms. Adjoining are an engine shed, parade corridors, seven cells, an office for the inspector of weights and measures, a large kitchen, &c. A patent lift to the council chamber, to be used on the occasion of banquets, is also provided. All the windows on the basement story are barricaded. Mr. E. Gibbons, of Ipswich, was the contractor. Mr. Edmund Catchpole has acted as the clerk of the works. Mr. W. P. Ribbans, the town surveyor, also supervised the erection of the building. For the masonry, Mr. Ireland, of this town, was sub-contractor. The more delicate portions of the carving are the work of Mr. Barrett. The plaster work was done by Mr. Adkins. Messrs. D. & E. Haggar, of Ipswich, supplied the gaseliers, and executed all the plumbing, painting, and glazing. The gas pipes were laid by the local gas company, and the sun lights were fixed by Mr. Stroud, of London.

SULPHUROUS ACID AS A FOOD PRESERVER.

DR. BAIKIE, of Edinburgh, says,—

"We have, for some years, been in the habit of fumigating the larder with the fumes of sulphur, particularly in moist, muggy weather, and in summer, and have never yet had a single article spoiled or become putrid, which is the more remarkable as we have, during the whole time, derived most of our supplies from the extreme north of Scotland, so that they were exposed to the influence of the external air and sun for at least thirty-six hours before they reached us. The mode of fumigation adopted is to put a small crucible into a pan of hot coals placed on the floor of the larder, and, when heated, project into it two or three small pieces of common stick sulphur, shutting all the doors and windows, and allowing the vapour to diffuse itself through the larder. This may be repeated once or oftener each day, so long as the weather continues hot or muggy. In a similar way, whenever called upon to attend a case which either is, or shows signs of becoming, contagious, I am in the habit of directing the room to be fumigated with sulphur thrown on hot coals repeatedly in the course of the day and night, and have never observed or heard of the least inconvenience or even effect arising from or attributable to the process."

We have already more than once spoken of the utility of sulphurous acid in fumigation, and recommended it in cholera seasons. We stated that Government had for many years used it in lazarettes (as they may still do) for the fumigation of all articles coming from plague-stricken countries. It was also used whenever articles of any kind — even letters — were passed out of these lazarettes to friends outside. But it is not in modern times alone that sulphurous acid has been esteemed: the old pharmacopœists, such as Salmon, speak very highly of it as a medicine, and Dr. Dewar, of Kirkaldy, in Scotland, has revived its use in this respect. The writer of this, many years since, in a course of medical experiments on himself in Scotland, made special use of it; but one objection he recollects of is, that he thought its internal use required care to prevent catching cold under its influence. Of course this is no objection to its external use as a sanitary agent or an antiseptic.

EMPLOYMENT FOR THE POOR.

MR. THOMAS WEBSTER, Q.C., has read a paper on "The Industrial and Profitable Employment of the Casual and Destitute Poor," at a meeting of the Department of Economy and Trade of the Social Science Association; Mr. R. Rawlinson, C.E., C.B., in the chair. The remedy for the admitted shortcomings and evils of the present system which he proposed was that which proved effective in Lancashire, and was frequently had recourse to by the Governments of Continental countries, namely, a provision of work and wages for the unemployed. It seemed, indeed, most inconsistent at the same time to be squandering millions in poor-rates and punishment, which produced no return, and leaving useful works which were demanding execution all over the country undone, which would prove a source of additional national wealth and advantage, employ industrial energy, and be actually remunerative. It was proposed, therefore, that a society be formed for the furtherance of these objects, to be assisted by a Government grant of public money, in order to enable it to carry on its operations on a sufficient scale, and that the society, under its Act of Parliament, should have compulsory power to take certain land for reclamation, on the usual terms of compensation to owners; that labourers be then employed in large numbers, lodged in temporary buildings to be erected for the purpose, and, if necessary, fed and clothed by the society. Something also must be done for those who are not able-bodied, for women and children.

BOULEVARD OF THE ARTS FROM PONT-STREET TO SOUTH KENSINGTON MUSEUM AND A GREAT GENERAL MARKET FOR THE WEST.

ALLOW me on public grounds to submit to you the following observations concerning the above important West-end improvements:—

1st. That such an enterprise as is presented by the boulevard in question would be the greatest and most appropriate monument the British nation could offer to the memory of the late Prince Consort, as the creator of South Kensington and the successful promoter of arts.

2nd. That if carried out in the spirit recently suggested in the *Builder*, with triumphal arches at each entrance, statues throughout on either side of the boulevard, dedicated to the great men past and future of the British empire, gardens, fountains, &c., thus giving to it a thorough national character, the grandeur of effect would call forth similar efforts elsewhere in the metropolis, and give rise to an entirely new school of architectural design.

3rd. That such a site (between Belgrave-square and South Kensington Museum) thus developed would be at once rendered a centre the most valuable as well as the most fashionable in London.

4th. That the parties who have the direction of this important undertaking are equal to the responsibility devolving upon them, in having to metamorphose thus so large a space (some 70 acres), of which about 30 acres are uncovered with houses, for the future embellishment and improvement of the West-end, and to insure success the secret consists in beginning well.

5th. The residences built on the "boulevard" having all the improvements of the day, will find buyers, because no freehold is to be had in Belgravia, and certainly none in any way comparable with the future "Boulevard of the Arts" is in existence in London; and it may be safely said, without exaggeration, that such favoured property must continue to increase in value as the place would be unique.

6th. *A Great General Market* for the west is imperatively demanded, and the neighbourhood surrounding the spot to be thus occupied affords many advantages owing to the poverty of much of the adjoining district (say of Lower Sloane-street and White Lion-street in front of the new suspended Chelsea Bridge), its facility of access from all parts, proximity to the river, and being in the centre of several railway stations, &c. &c.

An additional attraction might be here set forth, which, if carried out and organized in departments (fruit, flowers, vegetables, meat, poultry, &c.), after the magnificent model of our Parisian neighbours, would at the same time afford a most acceptable lounge, and one of the chief wants of the day, and one certain to result favourably in a mercantile point of view, which, after all, is the chief element of all English enterprise. The space occupied by such general market would be three or four times the size of Covent-garden Market. The place is now of a very inferior description; the cost of the ground would be small, for it cannot be improved, having in front of it the new barracks, and higher up Chelsea Hospital and Chelsea College, so that a market there is the only improvement suitable to it, and this would satisfy all classes, poor and rich.

7th. A great general market would improve our taste for better cooking and economy, and would be the only check on the extortions of tradesmen and retail markets from which all dwellers suffer, as the small dealers are completely now "masters of the situation." And very likely the architect who will build a city of palaces in Belgravia will see the opportunity and the necessity of turning his attention to the suggestion.

While on this subject, I venture to remark that a West-end fish-market somewhere on the banks of the Thames between Chelsea Bridge and Millbank would be a great boon to the poor inhabitants of its southern shore, as well as to those of Belgravia north and south.

A BELGRAVIAN.

ARCHITECTS' CHARGES.

RANDAL *v.* GRAY.

SIR,—I have seen a report in the *Builder* of a trial (Randal *v.* Gray) in which a clerk of works in my employ gave evidence, and, as might be expected, incorrect evidence, about architects' charges. I do not see how he could have any acquaintance with the subject. Of my own practice in such matters, he certainly knows nothing. His appearance at the trial is greatly to be regretted on every account. Being engaged by me in the superintendence of a definite work, his time, of course, is not his own property. Without my knowledge he was first consulted, and then was taken as a witness to Shrewsbury. This I learnt accidentally, and only a few days before the final trial. The case had then gone so far that had I forbidden him to appear I should have exposed myself to the charge of arbitrary interference with the course of justice. I think the charge would not have been an unreasonable one.

Judging by the report of the trial, my own name would seem to have been most improperly and unfairly used, the witness having been led to speak of that of which, I repeat, he could have had no accurate knowledge, and so to give an impression respecting my own practice altogether contrary to the fact.

W. BUTTERFIELD.

PIECEWORK AND APPRENTICESHIPS.

SIR,—I differ from your correspondent in his conclusions on the subject of piecework. That a skilful and muscular workman may find it sometimes advantageous to his interests to work by the piece, I admit; but that it is also to the advantage of the customer, who wants his work done *well*, I deny. An experience of nearly thirty years as journeyman and foreman has convinced me that, at least in the building trades, where we seldom do two things alike, and a pleasing variety prevails, if you want your work done well, you must get it done *day-work;* and this applies not to the journeyman only, but to the master contractor also. The system of contracting must be abolished, and the far more equitable system of measure and value or daywork substituted.

Then, again, piecework causes over-exertion. I have known several instances of this. One in particular occurs to me;—a joiner, who worked so hard in the ten hours, that he was positively unable to walk to his home at night, without holding on to the shop-fronts and lamp-posts for support. After a very few years he died a premature death, and his family went to the workhouse. The extra money he earned was all spent to support the extra waste of muscle, and his conduct led to the reduction of the price paid for the work; so that the employer got all the benefit.

I think that there ought to be, and that it will be necessary in the future to make, a difference

in the working hours in the summer and winter, especially for out-door work. I have often been on a scaffold for an hour or more in a morning, and from three-quarters of an hour to an hour in the evening, in raw, cold, foggy weather, when it has been sheer robbery to the employer to be there, and not only uncomfortable, but dangerous, to the workman. The same objection does not apply to the shop or in-doors; but, independently of the saving in gas, I should be glad to see a reduction in the hours of daily labour in the winter.

Trade or "technical" education I hold to be absolutely necessary to every workman, if good work is to be done, and I think that can best be obtained by the establishment in every district of a school under the Department of Science and Art; and workmen should be encouraged to attend such schools, and should be able, other things being equal, to obtain priority of employment on showing certificates to employers. At present the knowledge of practical geometry is woefully at a discount even among joiners and masons, to say nothing at all of bricklayers and plasterers, who seem to think that subject altogether foreign to them. What per-centage of London painters could undergo a very mild examination on colour, or joiners on botany, and the strength of timber, or plasterers on the chemistry of cements and free-hand drawing, or masons on geology?

And that brings me naturally to the subject of apprenticeships. I find them to be mostly a sham and a deceit; for if the apprentice is placed in a small shop where the master works with the men, yet he calls himself builder, and undertakes all branches, so that the apprentice is expected to do a bit of jobbing carpentering, then a bit of painting, and it may be bricklaying, or plastering, certainly whitewashing and cleaning, and at the end of his time he may be fit for a respectable labourer.

But it may be that the apprentice is placed in a larger shop, where several men of each trade are employed, yet there are some masters who take so many apprentices, that there will be one to each journeyman, or more, on the average. Here the employer is seldom seen more than once a day, and the whole care is left to a foreman. His position is an unenviable one, for generally there is a combination of the apprentices, who work and play just when they please, and set him at nought. I know such a shop well. The master gets 25*l.* to 30*l.* with each boy, and they have to learn their trade as best they can. There are seven apprentices to about six journeymen, sometimes less. The kind of work turned out may be imagined.

Now, I should like to see a plan adopted something like that which obtains in France, where every apprentice is bound by his indentures to attend a trade school at least one hour per day during his apprenticeship. Such a school under the Department of Science and Art would give certificates of competency in theoretical knowledge. After the apprentice is out of his time, which might, I think, be limited to five years,—say from fourteen to nineteen,—he should then be bound to serve as journeyman for two years more in any shop or buildings as he pleased. He should then be able to come up for examination before a competent judge appointed by the department, who would, if satisfied, give a certificate of mastership.

I venture to say that, with such a training, we should hear very little of bad work; our eyes would not be so often offended by its appearance, and much valuable life would sometimes be saved. Employers would, on engaging a man with such certificates, be confident that their materials would not be spoilt, and their money wasted; and every workman who owned such certificates would feel that he would be quite capable of executing any work entrusted to him with satisfaction to himself and to his employer.

E. G., a Workman.

PIECEWORK.

SIR,—If you will allow me, I should like to make a few remarks upon the letter preceding mine in your issue of the 25th ult., your correspondent "Jack Plane's" ideas and mine so widely differing upon the subject of piecework. I will endeavour to give a clearer proof, apart from personal experience, in support of my opinion, that piecework, as a recognised system, would be beneficial to employed and employer. The standard wages now in London are 37*s.* 8*d.* per week of fifty-six hours. Now I feel justified in asserting that nearly every man could in eight hours perform the same amount of work as he now does in ten, with the object of 1*s.* extra per day in view, without having to bring into action that amount of physical exertion that would be detrimental to health. Taking this to be the case, it would make fourteen hours' extra work in a week, which would amount to 9*s.* 4*d.* As "J. P." seems to infer that the employer requires a greater amount of profit upon piecework, I deduct 2*s.* 4*d.*; 7*s.* would then remain, which added to the present wages would form an income of 44*s.* 8*d.*: and there is not one man in twenty but would earn this amount if allowed to do so.

Quoting from the letter in question, "J. P." says, "I have known men in small towns who have been pointed at as those who, by overwork, had brought themselves to Death's door." I do not doubt it; but your correspondent does not tell us whether it was piece or day work that produced this disease of the system. I have known many such, and know in what manner it had been brought on;—with a great many, by their own folly, through being hard-drinkers, as well as hard-workers; when under the piece-work system, by overtaxing their strength for three or four days a week—days of (perhaps) fourteen hours, in order to make six days' wages, the other two or three days being devoted to what they call a "faddle." There are, I know, to be found in almost every shop a certain one or two who may be termed the "racers," or "leaders," who tax their strength and skill to the utmost, for the only inducement of being on familiar terms with the foreman, and being able to boast that they do more work than any other man in the shop. Now, because a few choose to injure themselves by overwork, it does not follow that the whole working community would imitate their example through the introduction of piecework. Let a price-list be drawn up, of every kind and quality of work, per foot, and a fair understanding between master and man, and I venture to say the working of the system would prove its success.

F. D.

"THE ARTIST AND THE PUBLISHER."

SIR,—In the last number of the *Builder*, "R." complains that my name, as the exhibitor of some sheets of "edible and poisonous mushrooms" at the South Kensington Museum is more prominent than that of Mr. W. G. Smith, the artist who drew them; and proceeds to say, "This is not right: it is another instance of the mischievous presence of the middle man." The idea is quite new to me that it is "*mischievous*" for a publisher to put his name to useful books because he is neither artist nor author. Does "R." mean to say that artists and authors ought to do without publishers? The book to which "R." alludes is intended to explain certain large diagrams of Fungi exhibited in the Food Collection of the Museum, and the sheets are published in a portable form to enable the public to carry true figures beyond the walls of the museum, and so to collect for themselves a source of food which may be had for the gathering. The prominence given to the name of the person from whom the public may obtain the work is therefore quite in order. If the pictures had been exhibited as specimens of botanical drawing any name but that of the artist would have been out of place.

Surely there are but few people who would give credit to the publisher for the skill which so manifestly belongs to the artist. The allusion of "R." to middlemen cannot apply to publishers, as the relative positions of "the artist and the publisher" can be readily seen by any intelligent man who takes the trouble to think about the subject.

ROBERT HARDWICKE.

*** "R." makes no complaint against Mr. Hardwicke, but claims, and we claim too, that if a work of art be exhibited, the name of the producer of that work be shown at any rate as prominently as that of the publisher or exhibitor of it. It is a matter of principle,—an important principle too.

WARRINGTON SCHOOL OF ART.

SIR,—The account given in the *Builder* of the 25th ult., under the above heading, of the gold medal awards to schools of art, refers to the competition which ended March, 1866. As this date was not mentioned, I think it only fair to those schools which were successful in the competition of March, 1867, to state, that in the latter competition the only provincial schools which obtained gold medals were—Glasgow, Kidderminster, Manchester, and Nottingham.

A SECRETARY.

DURHAM UNION WORKHOUSE COMPETITION.

SIR,—Being the author of the design bearing the motto "Shield and Half Moon," which was assailed in such an untruthful manner by a person signing himself "Fairplay," in your last week's issue, I consider it a duty to your readers to bring the true facts of the case before them.

In the first place, "Fairplay" says the "guardians issued *printed* instructions." This was not the case, the instructions provided were *written*; each competitor having to procure a copy for himself.

2. "Fairplay" says, "The crooked fence was just the obstacle which every competitor was desirous of removing;" he contradicts himself almost immediately after by saying, "it (*i.e.*, the boundary or fence wall) is built as straight as can be drawn upon paper." If this be the case, where was the obstacle that competitors were so desirous of removing?

3. "Fairplay" states that "the plans have been measured, and likewise the site, and the result is that the site will neither accommodate the plan in length *nor* breadth." This assertion, like the others, is not the truth, as the buildings are of considerably smaller area than the site.

4. "Fairplay" says,—"The plans are for a new house, and, according to the estimate, cannot be built for less than 9,000*l.*, while the average cost of the other *seven* designs is from 4,000*l.* to 5,000*l.*"

This, again, is false, as nearly the whole of the present buildings are retained in the design; and the estimated cost is between 7,000*l.* and 8,000*l.*, and not 9,000*l.*, as "Fairplay" says.

Even in the number of competitors "Fairplay" is mistaken, as, according to the committee's report, there were only seven designs sent in, instead of nine, as "Fairplay" says; and the estimates of the unpremiated designs range from 4,000*l.* to 8,000*l.*, not from 4,000*l.* to 5,000*l.*, as "Fairplay" states (one of the lowest estimates being, as the author states, *an approximate one*). Like this competitor I could have sent an approximate estimate between 4,000*l.* and 5,000*l.*; but what would have been the result if the design had been put into execution, and in the end (as is frequently the case in competitions) the cost had doubled the estimate?

5. "Fairplay" says "the plans were discovered to emanate from the office of a C.E." This is very like "Fairplay," and, like his other lying effusions, is without foundation, as the plans *did not* emanate from the office of a C.E., but from my own residence. Where can "Fairplay" emanate from? No doubt, time will solve the mystery.

6. "Fairplay" insinuates that the plans were altered after being before the committee. This is again false, as the plans can be at any time produced the same as first sent in.

The above *facts* ought to be sufficient to convince any one of the faith to be placed in "Fairplay's" statements.

WILLIAM FOX.

THE CO-OPERATIVE BUILDING COMPANY.

SIR,—Your report of the formation of the Co-operative Building Company, says that no one but operatives will be admitted as shareholders, or to take part in the management of the company. Being president of the committee, I can vouch for the committee that no such rule is contemplated. Mr. Walton, in his lecture to the masons at Wilcoke's Rooms, Westminster-bridge-road, January 12th, stated that he had not mentioned the labourers in his lecture, but that they must not think he had forgotten them, nor think that they would not be permitted to avail themselves of the opportunity to become shareholders, that the company would be open to the public in general as well as the building trades, and the more shareholders the better.

Also for the information of the Plumber who writes from Hyde, and the trade in general, I would beg to state that we should be most happy to receive a committee of plumbers to act with the committee *pro tem.* We meet every week at the Brown Bear, Broad-street, Bloomsbury, on Friday evenings, at eight o'clock.

THE PRESIDENT OF COMMITTEE.

DRAINAGE AND WATER WORKS, GIBRALTAR.

SIR,—Our attention has just been called to a letter appearing in your journal of 14th December last, with regard to the above works, and signed "The Contractor."

Will you allow us to say through your columns that the said letter is not from us, and that we are totally unacquainted with the author.

A. KYAN & Co.

Gibraltar.

CEMENT KILNS.

SIR,—Will you permit me to inquire whether any of your readers can furnish me with information respecting the best description of cement kilns at present in use, especially with respect to the application of the heat given out by the exterior of the kilns, for the purpose of drying the washed chalk in the tanks.

W. E. H.

CORROSION OF LEAD PIPES.

SIR,—I shall feel obliged if any of your readers can tell me of an effectual preventive of the corroding action of the ground on lead pipes. In a case now under my notice some suction pipes laid in marl and clay were so eaten away in thirteen years as to require renewal. I had the new ones surrounded with sand, but find they are already so corroded as to admit air, though having been in use only three years.

The water of the well has no effect on lead, as is proved by the inside of the pipes remaining perfectly clean and smooth.

JOHN HART.

TWO DAYS' NOTICE TO DISTRICT SURVEYOR.

Tolley v. *Kelk, Waring, Brothers, & Lucas.*—In Westminster Police-court on Saturday last, Messrs. Kelk, Waring Brothers, & Lucas were summoned by Mr. James Tolley, district surveyor of St. Margaret, St. John, and St. Peter, Westminster, for not complying with the 38th section of the Metropolitan Building Act, which requires two days' notice in writing before any building or any work in, to, or upon any building is commenced, to be given to the district surveyor, under a penalty of 20*l.*, to be recovered before a justice of the peace.

The district surveyor conducted his own case; Mr. Joyce, instructed by Messrs. Baxter, Rose, & Norton, appeared for the defendants.

From the opening speech of the district surveyor, it appeared that the defendants, as contractors for the Metropolitan District Railway, had taken down a house, No. 1, Smith's-place, York-street, and re-constructed the greater part of what was originally a party wall between Nos. 1 and 2 as an external wall to No. 2, which work, he submitted, required notice under section 38. He then proved service of notice on the 16th of January, calling defendants' attention to their neglect.

Mr. Joyce claimed exemption for the work under the 6th section of the Act, and stated that the wall was erected upon ground belonging to the railway company, and, although they were not actually using the wall at present, they could, and probably might, use it for affixing signals or placarding with notices.

The district surveyor said, assuming it to be a party wall, half belonging to the railway company, that he was entitled to notice for the other half, and informed the counsel that he was in error in stating that the ground belonged to the railway company.

Mr. Arnold.—The railway company cannot have the right to cut a hole through the wall into a gentleman's drawing-room, for instance.

Mr. John Man Ingall was called, and examined by the district surveyor. I reside at No. 30, York-street, Westminster. I am owner of No. 2, Smith's-place and the adjoining houses. The railway company purchased No. 1, and caused it to be pulled down; the wall erected is in lieu of the party-wall originally existing between Nos. 1

and 2. The wall is entirely on my ground. I produce the deeds with plan annexed.

Cross-examined.—Taking down the wall left the rooms exposed; it was necessary to rebuild it; the house was dangerous without. I believe it is done properly.

The district surveyor remarked that making it a case of emergency would not help the other side, as section 44 made it a condition that before the expiration of twenty-four hours after such work has been begun, notice thereof shall be given to the district surveyor.

Mr. Joyce.—I cannot sustain the defence longer, nor resist the infliction of a penalty; but as it seems we have been labouring under a mistake, and as I understand the district surveyor not to press for a heavy penalty, I trust your worship will make it as light as possible.

The district surveyor.—The *amount* of penalty is not my object, but the clear enunciation from the Bench of the necessity of giving notice. He then directed attention to the greatly-increased labour thrown upon district surveyors by the neglect; and said, knowing the respectability of the firm, it had been his unpleasant duty to summon, and feeling certain that it was with them a question of principle and not of fee, he begged to join in asking the magistrate to make the penalty as light as possible.

Mr. Arnold, in summing up, said, I never had a clearer case, and cannot understand upon what grounds the defence was undertaken, except, as the learned counsel has stated, under mistake; but as this is the first case against the defendants, and in consideration of your request, I think the object sought will be obtained by the infliction of a nominal penalty of one shilling and costs; but should another case be proved against the same parties before me, I shall feel it my duty to impose the full penalty, namely twenty pounds.

Railway Companies and the Building Act.—Sir:—As London is threatened to be cut up piecemeal, perhaps some further legislation is required, so that protection may be afforded to the public, and a little restraint put upon those companies who completely set at nought and ignore everybody else. Ranges of wooden workshops, with felt roof and iron smoke-pipes, have been carried up in Clerkenwell, clearly abutting on dwelling-houses. Substantial brick offices have been also erected in Exmouth-street by the contractor, for his own convenience; and he shelters himself under the plea that they are for the use of the railway, when, in fact, they are his own private property, over which the company have not any control.

A Parishioner.

THE TRADES MOVEMENT.

The operative slaters of Glasgow have taken advantage of the pressure of work consequent on the late storm to strike for a rise of wages. The masters have resisted the demand, on the ground, says the *Scotsman*, of its being a breach of a distinct agreement, arrived at some time ago, that no change should take place on the rates without three months' notice.

The reduction of 10 per cent. in the wages of ironworkers, which has been determined upon by almost all the principal firms in South Yorkshire, has resulted in a strike on the part of the men.

In accordance with a notice issued by Messrs. Hawks, Crawshay, & Co., a reduction of 1s. 6d. per ton for puddling has been made in the new plate-rolling mills. The men turned out on strike. This strike has occurred at a very inopportune time, as there are some excellent orders in course of execution. One Russian order for sixty-three bridges is to amount to 120,000*l*. An amicable settlement, however, was anticipated, as masters and men were to have a conference on the subject.

Mr. Roebuck has attempted to read the working men of Sheffield a lesson on the proper relations between labour and capital. He was listened to for a time, but at length the men hooted the hon. gentleman down. Subsequently, a proposal to award him a vote of thanks was indignantly rejected.

CHURCH-BUILDING NEWS.

Grendon Underwood. — Grendon Church, which has just been restored by Mr. Bruton, of Oxford, consists of nave, chancel, and western tower. Its date is the latter half of the thirteenth century, except the tower, which was built in the fifteenth century, at which period the walls of the nave were raised, the present roof put on, and several windows inserted in the walls. At that period, the chancel escaped; but about two centuries ago it was "improved," in the style then in fashion—a wagon-headed roof was put on it, and a broad flat-headed window inserted in the eastern wall. Subsequently the wagon-headed roof was plastered to the form of a semi-ellipse, severed through its longest axis. Fortunately the builders of this latter period left enough evidence of its former state to enable the architect to ascertain the dimensions and period of the destroyed eastern window, and sufficient remains of the glass to enable Messrs. Clayton & Bell to effect a restoration of that also, and these gentlemen have inserted all they could of the old glass to prove the faithfulness of the restoration. The nave roof has only been repaired, and stained to an even colour, and the walls newly plastered, while the windows and chancel-arch have had a mullion, or a portion of a jamb, &c., inserted where necessary, though all the windows have been newly glazed. A new open-timbered roof has been placed on the chancel, with framed principals and arched ribs, wind braces, &c., of as high a pitch as the gable end of the nave would permit. The walls of the chancel, where the work would allow, have been pointed instead of plastered. The floor of the church has been laid with tesselated pavement, increasing in richness as it reaches the east end, encaustic tiles being used with it in the sanctuary. The benches in the nave are wrought out of the old ones, which were of oak, the top moulded rails being re-used where possible, and the standards being also of oak. The remainder of the work is of stained deal, and the mixture of the wood does not detract from the effect. The old pulpit, of the Jacobean period, has been restored and removed to the north side and placed on a stone pedestal. The font has been repaired and placed near the south doorway. The doors are of oak, all new, and have ornamental hinges. The chancel-fittings, including lectern and altar-table, are also of oak, and were executed by Mayetts & Son, of Oxford. The rest of the work was by Jones & Sons, of Oxford, and Anthony, of Waddesdon, the latter of whom did the masonry, glazing, and chancel roof.

Mendham (Suffolk).—The church here has been restored. It was built in the time of Henry VII., in the Perpendicular style; and at a later date was added a clearstory, lighted by eight windows, and the roof was flattened. This had become in so bad a state that about eighteen months ago, a beam fell and smashed some of the pews. Mr. R. M. Phipson, architect, Ipswich and Norwich, was consulted, and it was found that nothing but a thorough restoration of the nave, with entirely new roofs for the aisles, would meet the case. This has been done. The floors have been laid with Minton's encaustic tiles; the old loose-box sort of pews have been superseded by oak benches, with stained deal seats, and carved poppy-heads, on which are represented many of the flowers and fruits of the country, some also containing inscriptions carved on scrolls, in church text. The stonework of the windows has been refaced and restored, and the windows are filled throughout with cathedral glass in two tints, worked in different patterns. In order to stop all appearance of damp, the walls have been cemented inside, and finished in stucco, which will obviate the necessity of whitewashing hereafter. The stone arches have been cleaned; a gallery at the west end has been removed; and the base of the tower thrown open to the church by a small and not very ornamental arch. There is a new panel ceiling to the tower, which contains six bells; the battlements have been restored, and the outer roof releaded. At the east end of the south aisle were found a priest's squint, a somewhat large one, with its original door, and in the south wall a piscina in good preservation, and both are now laid open. Originally there was a chapel here, and it is intended to throw a screen across and appropriate it to a vestry, the tower having hitherto served that purpose. At the east end of the north aisle a small organ has been erected upon a platform—the only elevation in the church. The church is heated with Gedney's underground stove. The entrance-door into each aisle is new. The outer walls have had the rough plaster taken off, the flint work has been pointed, and the stone mullions of the windows have been restored, and the stone dressings refaced. Several old trees in the churchyard fence have been removed, and the paths fresh gravelled. The work has been carried out by Mr. Grimwood, of Weybread; Mr. Jno. Groom, of Ipswich, and Mr. R. Godbolt, of Harleston, in that gentleman's employ, executed the carving. The works have cost about 1,500*l*.

Stamford Bridge.—A Chapel of Ease, attached to the parish church at High Catton, has just been consecrated. The edifice is intended to seat a congregation of 170 persons. It is dedicated to St. John the Baptist, and has cost about 1,500*l*. in its erection. Mr. G. F. Jones was the architect. The architectural design is Early English, of the thirteenth century, and the chapel consists of a nave and chancel. Its extreme internal length is 75 ft., and breadth 22 ft. Of the former 25 ft. are given to the chancel, and 50 ft. to the nave. The height from the floor to the apex of the nave is 27 ft. 6 in. The roof is high pitched, open timbered, and boarded—stained and varnished, whilst it is covered in with Westmoreland slates. The interior is lighted by lancet windows, the east end having three lights, with a quatrefoil window above; the west window is of two lancets, with quatrefoil head; the side windows are lancets, with stained borderings. The whole are filled in with cathedral glass. A bell turret, containing two bells, stands on the chancel arch, and the turret is surmounted by a cross, which makes the extreme height of the edifice 48 ft. The porch is on the north side of the nave, and the vestry on the north side of the chancel. The chancel arch is of stone, with nail-head moulding, springing from an impost. A font of Caen stone, and furnished with an oak cover, stands near the entrance to the church. The seats are open, of deal, and stained and varnished. The whole of the ironwork has been supplied by Messrs. Fryer & Son, of York. The material of which the chapel has been built is Bradford walling stone, and the dressings are of Ancaster stone. The yard is enclosed by a brick wall and iron fence. The masonry and brickwork of the place have been executed by Mr. Grange. Messrs. Weatherley & Rymer have been the joiners; Messrs. Hodgson the plumbers and glaziers; Mr. Worthington the painter and stainer; Mr. Wood the slater; and Mr. Young the plasterer.

STAINED GLASS.

Nottingham Parish Church.—A window of stained glass, in memory of Mr. George Mill White (an honorary surgeon of the General Hospital, and practitioner in the town and county of Nottingham), has been erected by his brother, Major Loraine White, Military Knight of Windsor, in the lancet light on the north side of this church. The window represents Hope, with face gazing upwards, the arms stretched down, and the hands clasped together in an attitude of rhapsody. The Holy Spirit hovers over the figure, and sheds rays of glory downwards: around the upper part of the figure are angels in attitudes of prayer; this is all upon a ground of ruby. In the top part of the window, and within a circle, is treated according to ancient form, the emblem of the Holy Trinity. In the lower portion, and in connexion with the simple inscription "In memoriam, G. M. W.," is a panel of grisaille, founded on an ancient glass in Salisbury Cathedral, in the centre of which, and placed on the grisaille, is shown the anchor (emblem of Hope), which is designed so that the upper limbs form a cross, on which rests the crown of thorns. Above this is the alpha and omega. The ground-work filling-in is of a grisaille pearly glass. The artists were the Messrs. O'Connor, of London.

Tetbury Church.—Another memorial window, the gift of Mr. W. Hamilton Yatman, of Highgrove House, has just been completed. It adjoins the one lately placed in the church by Mr. Alexander, and was executed by Messrs. Wailes, of Newcastle. It consists of four lights, which are divided transversely, and embrace two subjects, extending the full width of the window. The upper and larger is the Crucifixion, with groups of figures in the several lights, illustrating the various incidents recorded by the Evangelists. The subject at the base is the Entombment. The tracery is occupied by angels, bearing emblems of the Passion.

St. Saviour's, Southwark.—A stained glass window has just been put up in this church, the gift of the Rev. S. Benson, M.A., chaplain of the parish. The subjects are—1. The Christian desiring his heavenly rest. 2. The widows showing to St. Peter the coats and garments Dorcas had made while she was with them. 3. The Christian encouraged to faithfulness to the end by the crown of life. The artists are Messrs. Ward & Hughes.

Godstone Church.—A stained glass east window by Messrs. Ward & Hughes has been put up in this church, in memory of the late vicar, Archdeacon Hoare. The series represents the ministerial offices of Christ in His Church. In the centre light are three medallions representing the three great wonders of Redemption, the Crucifixion, the Resurrection, and the Ascension of our Lord. The lower side-medallions are symbolical of the two Sacraments: Baptism—young children are brought to Christ that He may bless them; Holy Communion—He is

making Himself known to the two disciples at Emmaus in the breaking of bread. Above, Christ the Good Shepherd extends his care over the "little flock;" and on the other side the net of the Gospel is being brought to land, and the produce of the miraculous draught laid at the feet of Him who had blest the disciples' toil. In the two upper medallions are the woman of Samaria and the Sermon on the Mount.

Leintwardine Church.—A stained-glass window has just been put up in this church. The style is Perpendicular, and the window is composed of four main openings and tracery. The artist has sub-divided the window laterally, and the spaces formed by the two centre upper divisions have been filled with Our Saviour restoring the Blind to Sight, the corresponding spaces below being filled with the Adoration of the Magi. The four remaining spaces in the side lights are filled respectively with the Annunciation, St. John preaching in the Wilderness, the Baptism, and the Presentation in the Temple. These subjects are all inclosed within canopies and texts of Scripture explanatory of the subjects are inscribed beneath each picture. The tracery is filled with the Agnus Dei; cup and vine; the Pelican in her Piety; the symbol of the Holy Ghost; with sacred monograms, surrounded by foliated work. The window was put up by Mr. C. J. C. Prestcott, in memory of his father, Mr. John Clarke Prestcott. It was executed by Messrs. R. B. Edmundson & Son, of Manchester, and is one for which they received the jurors' medal at the late Exposition in Paris.

Books Received.

A NEAT edition, in two volumes, of John Spencer's "Things New and Old," has been issued by Mr. Tegg. It is a book full of wisdom, and not to be objected to because mostly taken out of other men's books and sermons. As Dr. Thomas Fuller says in his preface to it (January 10th, 1657), "Is the spider's poison the better for being sucked out of herself, or bees' honey the worse for being extracted from flowers?"——The current *Quarterly Review* contains a valuable article on the British Museum, and which advocates the removal of the natural history objects from Bloomsbury. The writer is wrong, as other writers before him, in giving the whole credit of the new reading-room to Mr. Panizzi. The idea of a circular building for the purpose on the site it occupies, was first published by the late Professor Hosking, in the *Builder*, and the present building is the work of Mr. Sydney Smirke. Much is, doubtless, due to Mr. Panizzi; but to say that the reading-room, "the largest," as the writer calls it, "best built, best lighted, best arranged, and really most beautiful apartment the world has yet seen," issued forth, "full grown, from the brain of the British Museum Jupiter, armed at all points against criticism," is downright nonsense and great injustice.——An agreeable paper, entitled "Rambles," in *Fraser*, shows what Gilpin (of the "Forest Scenery," &c.) did by means of his sketches, which were of a bold, generalizing character, picturesque rather than precise. These sketches —made with a reed pen and a brownish "iron-water" ink, and afterwards "toned" with a yellow wash — he used to give away to his friends, until it came into his mind that he might make by these means some money for the benefit of his poorer parishioners. He had already, out of the profits of his books, built and opened a school at Boldre for the children of day labourers, twenty boys to be taught reading, writing, and cyphering; twenty girls, reading, sewing, and spinning. To this school he wished to leave a permanent endowment, and also an aid to the school at Brockenhurst: so he sold for these ends a collection of his drawings, received 1,200*l.* for them, and put this into the Three per Cents. "The sum being still insufficient to carry out all his intentions, he went to work again with his reed-pen, at the age of seventy-eight, and in two years produced a large number of drawings. These, 'the last effort of my eyes,' were sold by auction at Christie's, and produced no less than 1,625*l.* The schools were endowed accordingly, and the Boldre children, in addition to being taught free of all charge, receive yearly, the boys a jacket, pair of breeches, and a green vest; the girls, a green frock and black petticoat." We heard only a day or two ago of a clever lady who had taken a similar step, successful in a smaller degree. A stained-glass window was wanted in the parish church, partly restored, and funds were not forthcoming, on which the lady in question went to work, made little drawings of a number of the churches in the country, which were lithographed, and have been sold readily, far and wide, for the benefit of the window fund.——The February number of *London Society* is more than usually entertaining.

Miscellanea.

THE ROYAL GOLD MEDAL OF ARCHITECTURE.—The council of the Royal Institute of British Architects have resolved to recommend Mr. Layard, M.P., to the members for the Royal Gold Medal.

NEW CHURCH AT BRIERLEY, NEAR CUDWORTH. The tender of Mr. Ridal, of Sheffield, for a new church at Brierley, near Cudworth, has been accepted. Mr. G. S. Foljambe, of Osberton, has presented the site, together with 1,000*l.* towards the building, besides providing the endowment.

JETS OF NAPHTHA.—An artesian well of naphtha has been discovered at Kudaco, in the Caucasus, by boring. At the depth of 274 ft. from the surface the liquid was first struck, and for a whole month gave a supply of 1,500 barrels daily. Since then a fresh source has been met, which rises with irresistible force to the height of 40 ft. above the ground, the jet being 4 in. in diameter, and delivering a daily supply of 6,000 barrels.

MANCHESTER FIRE BRIGADE.—The superintendant of the Manchester Fire Brigade, Mr. Fozer, has just issued his official annual return of fires that have been attended in that city from September 29th, 1866, to September 29th, 1867. Of the total number of 294 fires, thirty-two have been serious, or one-sixth or more of the property destroyed; and 262 slight, or less than one-sixth destroyed. The total amount of property destroyed is 42,207*l.*, out of 1,116,604*l.* at risk. There are 41 firemen employed. In 1847, the amount of property destroyed was 42,653*l.*, or 21·4 per cent. on the amount of risk; in 1857, the amount destroyed was 30,237*l.*, or 5·3 per cent. on the risk; in 1867, the amount destroyed was 25,605*l.*, or 2·4 per cent. on the risk.

THE INSTITUTION OF CIVIL ENGINEERS.—At the meeting on January 28th, Mr. C. Hutton Gregory, president, in the chair, the paper read was "On the Relation of the Fresh-water Floods of Rivers and Streams, to the areas and physical features of their Basins; and on a Method of Classifying Rivers and Streams, with reference to the magnitude of their Floods—proposed as a means of facilitating the investigation of the Laws of Drainage," by Lieut.-Col. P. P. L. O'Connell, R.E. With the view of illustrating how far this method of classifying rivers as flood-producers was likely to prove useful, reference was made to some facts respecting the Mississippi and its tributaries, as recorded in the report on that river by Capt. Humphreys and Lieut. Abbot, who intended to show, in the author's opinion, that the method might be usefully, if cautiously, applied.

MR. FOTHERGILL COOKE AND THE ELECTRIC TELEGRAPH.—While glad of the recognition of Sir Charles Wheatstone's claims to honour on account of his share in the advancement of electric telegraphy, we hope the Government do not intend to overlook the unquestionable claims of Mr. Fothergill Cooke to recognition also as the introducer of the practical telegraph. The Society of Arts awarded their fourth gold Albert medal to Mr. F. Cooke and Mr. Wheatstone, but Mr. Wheatstone himself, cordially acknowledging that "Mr. Cooke is entitled to stand alone as the man to whom this country is indebted for its practical introduction," did not even claim his duplicate medal, though we think he might have fairly done so; thus leaving the honour of receiving it to Mr. Cooke alone. We must recollect, too, that Sir Charles Wheatstone is not the only one who has been honoured in connexion with the electric telegraph, but that Mr. Bright, the engineer, was also knighted, in connexion with the certainly noble work of merely laying the first line of telegraph across the Atlantic. It would be most invidious now to overlook Mr. Cooke's claims; and even were a knighthood not acceptable to him, there are other modes of doing him justice as well as honour.

A MINE ON FIRE.—The mine of Trien-Raisin, in Belgium, has taken fire, and 12,000 tons of small coal are burning.

EDUCATIONAL CONFERENCE, SOCIETY OF ARTS. A full report of the proceedings at the conference will be found in the "Journal of the Society of Arts" for January 31st.

TO PAINT OR PAPER ON DAMP WALLS.—Messrs. De Grelle have sent us, in reply to "G. D. B." and others, a sample of their prepared tinfoil to lay over the damp parts. As the inquiry is from numerous quarters, we depart from our custom, and say the address of the preparers of it is 79, Basinghall-street.

THE DILAPIDATED COURT OF JUSTICE AT TONBRIDGE.—Mr. Lonsdale, judge for the district, had to sit with hat and overcoat in the primitive justice-hall at Tonbridge, the other day. It is a curious old edifice, and in a bad state of repair. Something should be done, either to put it in a proper condition, or to erect another building for the purpose.

THE SUFFOLK AGRICULTURAL ASSOCIATION'S COTTAGE PLAN COMPETITION.—It has been resolved to publish six only of the plans, including the prize ones, the subscription and vote together amounting only to 27*l.* The cost incurred in reducing the plans, and lithographing 1,000 copies of each, was 28*l.* 10*s.*, and other charges brought up the outlay to 36*l.* Copies may be had at 3*s.* each. Competitors who refused to allow their plans to be lithographed will not have copies sent them, but the other competitors will.

THE HURRICANE OF FRIDAY AND SATURDAY.—We do not recollect of so many casualties in London by any single gale as were caused by the powerful wind of Friday in last week. Chimneys have been blown down, and roofs and floors smashed, houses unroofed, gable-ends and even houses thrown down in various parts of the metropolis. Similar damage has been done in many of our country towns, and the whole country has suffered. At Bradford two chimneys, each 90 ft. high, were knocked over. At Batley a building 50 yards long, and three stories high, was blown down, and so on. The rain, too, swelled rivers and destroyed bridges, as on the Cambrian railway.

PROPOSED REBUILDING OF ST. ANDREW'S, HERTFORD.—The *Herts Guardian* says,—The news that plans are again invited for a proposed new church in this parish will be received with general surprise, and by very many with regret. It is a matter of common notoriety that several years ago, when designs were sent in for the church, those of Messrs. Smith & Son were accepted. They were exhibited in the Shire Hall as the accepted plans, together with plans from Mr. T. Y. Kimpton and other architects. The public will await, with considerable curiosity, the reasons to be given for quietly ignoring of plans that have been accepted; and, as such, publicly exhibited.

RESERVOIRS IN INDIA.—In fourteen districts of the Madras Presidency there are 43,000 irrigation reservoirs now in operation; and 10,000 more have fallen into disuse. The embankments by which their waters are retained in natural hollows, valleys and combs, average half a mile in length: one dam, now broken, is thirty miles long, and incloses an area of from sixty to eighty square miles. The Veranum tank comprises fifty-three square miles, has a dam of twelve miles long, and produces 11,450*l.* per annum. In Ceylon is a solid dam, built of cemented stone, and covered with turf, which is fifteen miles long, 100 ft. wide at the base, and 40 ft. wide at the top. Generally speaking, these enormous tanks are effective.

THE EFFECT OF STRIKES.—In the Town-hall, Newcastle, a number of working men recently appeared on the platform before an immense audience, their object being to condemn strikes and endeavour to win either the sum of 15*l.* or a gold watch of the value of 5*l.* These prizes were offered by Messrs. A. B. Joseph & Co. Mr. Joseph Cowen, jun., occupied the chair, and some gentlemen officiated as judges. There were thirty-five competitors in all, representing nearly every trade, and belonging to different towns and villages in the district. The subject of the speeches was "Strikes, and how to prevent them: showing their Disadvantages to Nations and Individuals." Each competitor was a *bonâ fide* working man, and no speech was read. Many of the speakers displayed considerable ability, and were warmly applauded.

STOPPING-PLACES, RAILWAY STATIONS. — "Piscator" draws attention to the erroneous level of the pavement of these places, and the nuisance that results. We are not disposed, however, to go farther into it. The architects of railway companies should take the hint.

THE ROYAL ACADEMY.—On Friday evening, 31st ult., the full members of the Royal Academy assembled in their council chamber, Trafalgar-square, to elect three associates. The following gentlemen, Mr. George Leslie and Mr. William J. Orchardson, were elected associate painters; and Mr. Thomas Landseer was elected associate engraver.

COMPETITION, PERU.—An architectural competition, open to all nations, is announced by the Peruvian Government; the subject being a design for a monument to commemorate the victory obtained on the 2nd of May, 1866, over the Spanish squadron. Drawings are to be sent to the Peruvian Legation in Paris, 66, Rue de Ponthieu, on or before the 15th of February.

EVERY ONE TO HIS TRADE. — A Bellhanger complains that at a house in Croydon the bell-hanging has been done by carpenters, who know nothing about it, and that it will soon prove worthless. If the latter part of the statement be correct the transaction is a fraud on the employer, and should be condemned. To the mere assertion that a builder had a carpenter who understood bellhanging and allowed him to do it, we should have nothing to say. We are perfectly satisfied as to the advantages of free trade.

TRAMWAYS IN LONDON. — The Metropolitan Tramway Bill has passed standing orders before Mr. Palgrave, one of the examiners for Parliament. This Bill failed to pass during two previous sessions, but owing to an alteration made by Parliament in standing orders during last session the numerous technical difficulties previously existing were removed. The Liverpool Tramway Bill, promoted by the same parties, comes before Mr. Palgrave on Thursday. All opposition to it has also been withdrawn, excepting that of the Liverpool omnibus proprietors. It has been supported by the corporation of Liverpool and all the local authorities during the last two years, and it is believed it will be successful this year.

THE CHADWICK MONUMENT FOR BOLTON.—A large and influential meeting was held in the Temperance Hall, Bolton, convened by the mayor (Alderman Barlow), to initiate steps for a public recognition of Dr. Chadwick's liberality to that town. The Mayor presided. Lieutenant-Colonel Gray, M.P., and many gentlemen of prominence in the town took part in the proceedings. Mr. Barnes, M.P., expressed by letter his entire concurrence in the movement. The following resolution was adopted:—"That in commemoration of the munificent donation made by Mr. James Chadwick in providing improved dwellings for the poor and the establishment of an orphanage in this town, a statue be erected by public subscription, the design, material, and site for which shall be such as may be hereafter determined by the committee to be appointed at this meeting." Other resolutions were passed appointing the committee for carrying out the object of the meeting.

DONCASTER NEW MARKETS.—The tenders for the extensions and improvements of the Doncaster Cattle Market were opened by the market committee, at the Mansion-house. They were in two sets, namely, for the builders' and contractors' work, and for the ironwork,—the former series consisting of nine tenders, and the latter of twenty-seven. The work to be done under the first-named head is the building and completing of three new slaughter-houses, with pinning-pens and boundary walls, &c.; the laying out of a new cattle-market, making roads and paving floors, constructing drains, sheds, with all the necessary adjuncts. The lowest contract was that of Mr. Wm. Huddleston, of Lincoln, 4,298*l.*, and it was unanimously recommended by the committee. The highest contract was that of Messrs. S. & W. Pattison, Ruskington, Sleaford, namely, 5,366*l.* The smiths' and iron-founders' tenders were required for "the cast and wrought iron work necessary for constructing and erecting pens for 5,000 sheep, 750 pigs, and 120 fat beasts." The lowest contract was here again accepted—that of the York Railway Plant Company, York — namely, 1,020*l.*; the highest tender being 2,050*l.* 10s. 9d., sent in by Messrs. Cliff & Company, Bradford. These recommendations of the committee will come before the council for confirmation on the 11th inst.

THE ANSTICE MEMORIAL, MADELEY.—The committee chosen by the subscribers have inspected the designs and plans sent in by architects. Upwards of fifty designs were placed upon the walls, and their merits discussed. Ultimately it was agreed that they should be again exhibited, after which the subscribers to meet to make a selection.

A STATUE OF DEATH.—A singular will case has come before the Roannes courts. A M. Pitre died last year, and left his property to his heirs on condition of their spending 1,500*l.* sterling in erecting a bronze monument on his tomb representing Death, under pain of forfeiting the property, in which case it would go to the sick poor of the town. The heirs wish to evade this clause. Why should they be allowed to do so?

MR. GLADSTONE AND THE TRADES UNIONS.—A special meeting of the sub-committee of trades' delegates, to arrange the proceedings of the conference to take place with Mr. Gladstone on the 18th of February, has been held, and it has been decided that the following questions form the subject of the conference:—(1) The limita- of apprentices; (2) the minimum standard of wages; (3) piecework and overtime; (4) the alleged action of trades unions in driving trade to foreign countries; (5) the practical advantages of trades' unions.

TRINIDAD BITUMEN AND CHEAP GAS. — A limited company appears to have been formed for the purpose of working the bitumen lake of Trinidad, which belonged to the late Earl of Dundonald, as a substitute for bog-head mineral in the improvement of gas from coal. Mr. A. A. Cochrane, of Westminster, it is reported, has succeeded in obtaining excellent results, although the bitumen in its natural state contains about 23 per cent. of water and 28 of ash, with a good deal of sulphur. The application of bitumen to coal in the economization of gas has been patented by Messrs. Cochrane & Upward.

THE WESTMINSTER PALACE HOTEL COMPANY.—The half-yearly meeting of this company has been held at the hotel, Sir Charles Russell, bart., M.P., in the chair. The report stated that the gross receipts for the half-year ending December, 1867, had been 11,970*l.* 16s. 5d., and the expenditure 9,666*l.* 2s. 6d., leaving as net profit 2,304*l.* 13s. 11d., which, after deducting 737*l.* 7s. interest on mortgage, and after charging the amount of the reserve funds, 941*l.* 19s. 1d. would, with the amount carried over after paying the last dividend, namely, 1,523*l.* 0s. 10d., leave to the credit of profit and loss account 2,148*l.* 8s. 8d. The directors recommended the shareholders to forego a dividend this half-year. The chairman, in moving the adoption of the report, regretted exceedingly having to place so unsatisfactory a state of things before the shareholders as the recommendation of no dividend. This result was due to the great depression prevailing, and to the fact that the portion of the premises lately occupied by the India Board was still unlet and unsold. The chairman asserted that the utmost economy had been exercised. The report was adopted.

TENDERS.

For pulling down and rebuilding house, 9, Woodstock-street, for Mr. Machu. Messrs. Parriss & Co., architects:—

Winterton	£1,339 0 0!
Sawyer	1,230 0 0
Nightingale	1,226 0 0
Wilcox	1,190 0 0
Palmer	1,167 0 0
Ennor	1,138 0 0
Sharpington & Cole	1,130 0 0
Schofield	1,110 0 0
Crabbe & Vaughan	1,098 0 0
Faulkner & Lee	1,089 0 0
West	1,053 0 0
Wilson	1,049 0 0
Snowden	1,045 0 0
Rogers & Richards	970 0 0
Perkins	927 0 0
Cubitt	818 0 0
Smith & Simmons	735 0 0!

For the erection of a clock tower in the Old Haymarket, Leicester. (The furnishing of four statues of ancient benefactors to the town and the carvings not included.) Messrs. H. Goddard & Son, architects:—

Osborne, Brothers	£940 0 0
Neale & Sons	880 0 0
Barfield (accepted)	546 0 0

For house at Twywell, Northamptonshire. Mr. R. W. Johnson, architect:—

Wilson	£436 10 0
Barlow	434 12 0
J. Henson	433 0 0
W. Henson	427 10 0
Gunn	420 0 0
Coates & Fletcher	419 17 10

For proposed new Workhouse for the parish of St. Mary, Islington. Mr. R. H. Burden, architect:—

Heath	£98,000 0 0!
Hill & Keddell	80,073 0 0
Simpson	79,950 0 0
Foale	79,600 0 0
Piper & Wheeler	79,100 0 0
Kirk & Parry	78,930 0 0
Jackson & Shaw	78,850 0 0
Patman & Fotheringham	76,596 0 0
Higgs	76,350 0 0
Palmer	74,360 0 0
Myers & Sons	74,280 0 0
Manley & Rogers	73,510 0 0
Carter & Son	73,385 0 0
Mansfield & Price	72,347 0 0
Mansbridge	72,269 0 0
Bracher & Son	70,500 0 0
Perry	69,873 0 0
Executors of John Adams	69,194 0 0
King & Sons	68,885 0 0
Hart	68,793 0 0
Webb & Sons	68,350 0 0
Lacey & Flaxman	66,476 0 0
Henshaw	66,400 0 0
Nutt & Co.	61,800 0 0
Sawyer	43,586 0 0!

For alterations and additions to the house and business premises of Mr. John Flemons, High-street, Leighton Buzzard. Mr. Frederick Gotto, architect:—

Dawson	£365 0 0
Holdstock	363 0 0
Barker	355 0 0
Adams	310 0 0
Whiting	300 0 0
Groom (accepted)	295 0 0

For residence at Kettering. Mr. R. W. Johnson, architect:—

Hawthorn	£1,299 18 0
Henson	1,277 0 0
Barlow & Britten	1,202 5 0
Wilson	1,197 0 0

For erecting tavern and shop in Old-street, St. Luke's, for Mr. A. Bowden. Mr. T. J. Hill, architect:—

Brown	£3,307 0 0
Chessum	3,134 0 0
Sabey	3,049 0 0
Perry	3,016 0 0
Moreland & Burton	2,995 0 0
Rivett	2,953 0 0
Webb & Sons	2,769 0 0
Ennor	2,651 0 0
Henshaw	2,629 0 0

For alterations and reinstatements of No. 5, Shepherd's Market, Mayfair. Mr. Charles Innes, architect:—

M'Lachlan	£464 0 0
Wilcox	429 0 0
Preedy & Son	416 0 0
Thomas & Son	405 0 0
Snowden	398 0 0
Fish	394 0 0
Henderson & Cairn	393 0 0
Sapwell	388 19 0
Nightingale	382 0 0
Perkins	377 0 0

For alterations and repairs to premises, Bucklersbury. Mr. J. Ebenezer Saunders, architect. Quantities by Messrs. Birdseye & Stoner:—

Young	£1,481 18 7
Carter	998 0 0
Colls	968 0 0
Ramsey	966 0 0
Forrest (accepted)	947 0 0

For the erection of new schools at Fallowfield, near Manchester. Mr. Ernest Bates, architect. Quantities supplied:—

Robinson & Son	£1,130 0 0
Ward & Co.	1,120 0 0
Porteous	1,100 0 0
Quillish	1,060 0 0
Thornton	1,055 0 0
Grimshaw & Co.	1,040 0 0
Meadows	1,027 0 0
Brown	1,005 0 0
Barber & Gibson (accepted)	1,000 0 0

For a factory and stables in Peckham-grove, Camberwell, for Mr. Jones. Mr. Coe, architect. Quantities supplied —

Larke	£785 0 0
King & Sons	760 0 0
Batchelor	739 0 0
Johnson	719 0 0
Shapley & Webster	673 0 0
Smith	658 0 0
Mortar	654 0 0

For building two houses at Stratford New-town, for the Temperance Building Society. Mr. William Paice, architect. Quantities supplied:—

Nightingale	£425 0 0
Perkins	419 0 0
Snowdon	356 10 0
Wheeler	338 0 0
Pierce & Booth	320 0 0

TO CORRESPONDENTS.

H. L.—J. S. B.—W. W.—J. H.—F. G.—Mr. B.—J. J. M'C.—A. M.—H. C.—J. R.—P. C.—A. Z.—H. L. P.—W. F.—G. & K.—J. H.—W. H. B.—J. M. P.—J. T—W. B.—C. P.—H. H.—B. P.—F. B. P.—J. G. S.—J. F.—E. & Son.—T. J. H.—T. C. C.—T. L. D.—D. G. H.—T. J.—S. & W.—B. & G.—J. E. S.—Mr. E.—W. W. P.—C. I.—W. E. W.—A. O'C.—H. S. (we cannot write letters on private disputes).—*L'Avocato del Diavolo* (should send his name as guarantee of good faith).—E. J. P. (we are forced, uniformly, to decline).—G. H. T. (A. is wrong).—Mexican Architecture (continuation shortly).—W. H. (next week).

We are compelled to decline pointing out books and giving addresses.

All statements of facts, lists of Tenders, &c., must be accompanied by the name and address of the sender, not necessarily for publication.

NOTE.—The responsibility of signed articles, and papers read at public meetings, rests, of course, with the authors.